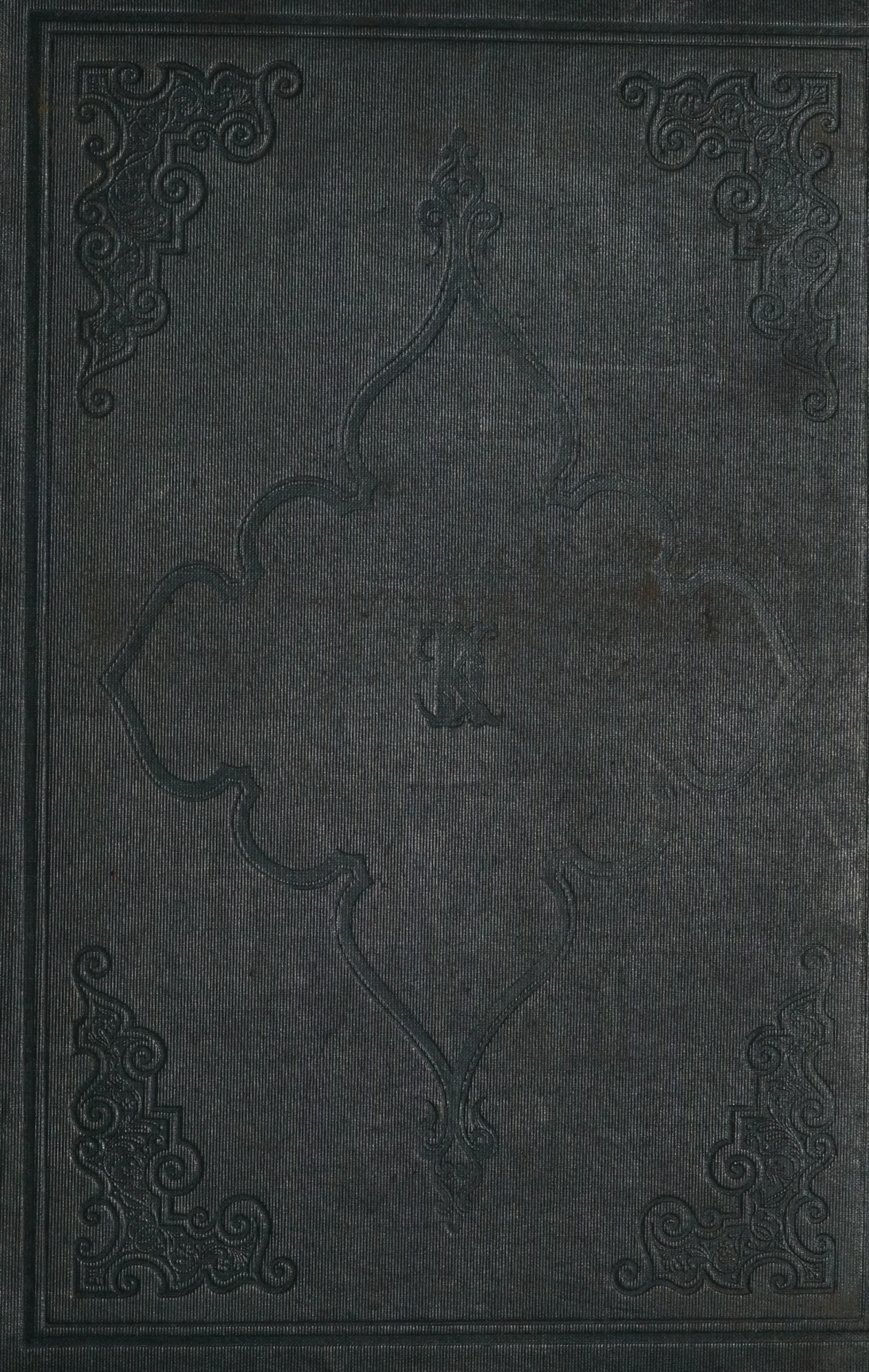




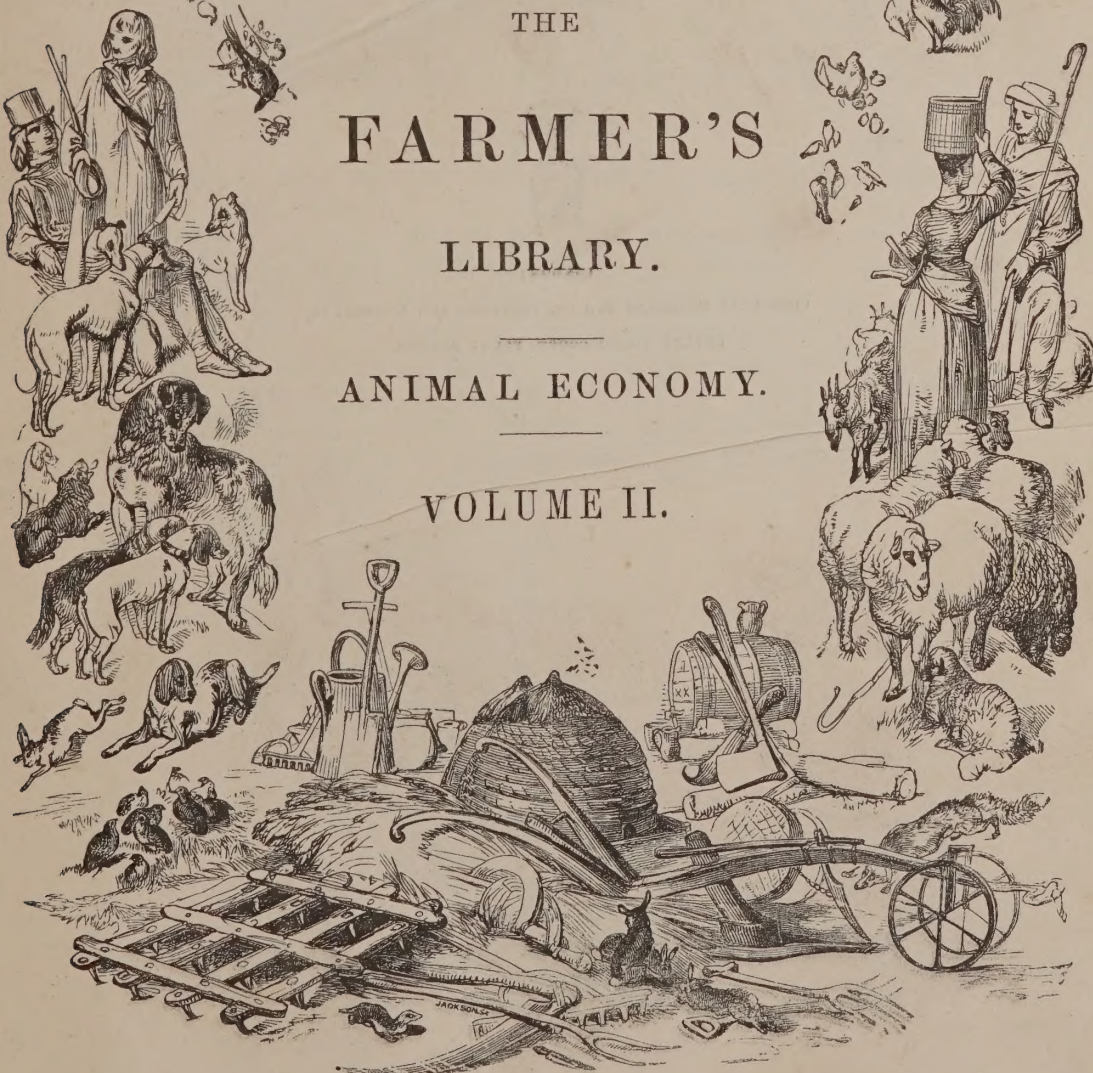
Contains
'The Sheep' & 'The Dog'
by Martin
'The Dog'
by Jonath.
'Poultry' by Martin



THE
FARMER'S
LIBRARY.

ANIMAL ECONOMY.

VOLUME II.



LONDON: CHARLES KNIGHT.

[1848]



LONDON:

VIZETELLY BROTHERS AND CO. PRINTERS AND ENGRAVERS,
PETERBOROUGH COURT, FLEET STREET.



TABLE OF CONTENTS.

THE SHEEP.

CHAPTER	PAGE
I.—ANCIENT HISTORY AND VALUE ; ITS WOOL	1
II.—NATURAL HISTORY OF THE SHEEP	16
III.—A GENERAL REVIEW OF THE DOMESTIC RACES OF SHEEP	33
IV.—ON THE VALUE AND DIFFUSION OF THE MERINO BREED	51
V.—GENERAL OBSERVATIONS ON THE BRITISH SHEEP	74
VI.—OUR DOMESTIC BREEDS OF SHEEP	90
VII.—THE LONG-WOOLLED SHEEP	123
VIII.—THE SHEEP OF IRELAND	137
IX.—SUPPLY OF LONDON.—WOOLLEN MANUFACTURES	143
X.—ON THE LLAMA AND SOME OTHER WOOL-BEARING ANIMALS	155
XI.—GENERAL MANAGEMENT OF SHEEP	164
XII.—DISEASES OF SHEEP	172
MEDICINES EMPLOYED IN THE TREATMENT OF SHEEP	216

THE DOG.

I.—THE EARLY HISTORY AND ZOOLOGICAL CLASSIFICATION OF THE DOG	221
II.—THE VARIETIES OF THE DOG—FIRST DIVISION	228
III.—THE VARIETIES OF THE DOG—SECOND DIVISION	247
IV.—THE VARIETIES OF THE DOG—THIRD DIVISION	284
V.—THE GOOD QUALITIES OF THE DOG; THE SENSE OF SMELL; INTELLIGENCE; MORAL QUALITIES; DOG-CARTS; CROPPING; TAILING; BREAKING-IN; DOG-PITS; DOG-STEALING	289
VI.—DESCRIPTION OF THE SKELETON. DISEASES OF THE NERVOUS SYSTEM:—FITS; TURN-SIDE; EPILEPSY; CHOREA; RHEUMATISM AND PALSY	296
VII.—RABIES	303
VIII.—THE EYE AND ITS DISEASES	320
IX.—THE EAR AND ITS DISEASES	323
X.—ANATOMY OF THE NOSE AND MOUTH; AND DISEASES OF THE NOSE AND OTHER PARTS OF THE FACE. THE SENSE OF SMELL; THE TONGUE; THE LIPS; THE TEETH; THE LARYNX; BRONCHOCELE; PHLEGMONOUS TUMOUR	328
XI.—ANATOMY AND DISEASES OF THE CHEST. THE DIAPHRAGM; THE PERICARDIUM; THE HEART; PLEURISY; PNEUMONIA; SPASMODIC COUGH	338
XII.—ANATOMY OF THE GULLET, STOMACH, AND INTESTINES. TETANUS; ENTERITIS; PERITONITIS; COLIC; CALCULUS IN THE INTESTINES; INTUSSUSCEPTION; DIARRHŒA; DYSENTERY; COSTIVENESS; DROPSY; THE LIVER; JAUNDICE; THE SPLEEN AND PANCREAS: INFLAMMATION OF THE KIDNEY; CALCULUS; INFLAMMATION OF THE BLADDER; RUPTURE OF THE BLADDER; WORMS; FISTULA IN THE ANUS	344

TABLE OF CONTENTS.

CHAPTER	PAGE
XIII.—BLEEDING; TORSION; CASTRATION; PARTURITION; AND SOME DISEASES CONNECTED WITH THE ORGANS OF GENERATION	361
XIV.—THE DISTEMPER	367
XV.—SMALL-POX; MANGE; WARTS; CANCER; FUNGUS HÆMA- TODES; SORE FEET	374
XVI.—FRACTURES	379
XVII.—MEDICINES USED IN THE TREATMENT OF THE DISEASES OF THE DOG	382
APPENDIX.—NEW LAWS OF COURSING	385

THE HOG.

I.—THE HOG TRIBE	389
II.—THE WILD HOG	407
III.—ON THE CHARACTER AND GENERAL UTILITY OF THE HOG AS A DOMESTIC ANIMAL, AND ON ITS WIDE EXTENT OF DISTRIBUTION	442
IV.—ON THE PRINCIPAL BREEDS OF PIGS IN THE BRITISH ISLANDS	462
V.—ON THE GENERAL MANAGEMENT OF SWINE	475
VI.—ON THE DISEASES OF SWINE	486

POULTRY.

I.—INTRODUCTORY OBSERVATIONS.—ON THE STRUCTURE AND HABITS OF GALLINACEOUS BIRDS.—THE CHARACTERS OF THE PHASIANIDÆ, AND THE ORIGIN OF THE DOMES- TIC FOWL	493
II.—ON THE PRINCIPAL BREEDS OF FOWLS IN OUR ISLAND.—ON THEIR VALUE IN AN ECONOMIC POINT OF VIEW	508
III.—ON THE GENERAL TREATMENT AND MANAGEMENT OF FOWLS	521
IV.—HISTORY OF THE TURKEY, THE PEA-FOWL, THE GUINEA- FOWL, AND THE CURASSOW	546
V.—THE COLUMBINE ORDER	570
VI.—GENERAL HISTORY OF THE NATATORIAL ORDER (NATATOIRES), AND OF THE DOMESTIC SPECIES RECLAIMED FROM IT	581

BEEES.

THE MANAGEMENT OF BEES	617
PROFITS OF BEE-KEEPING	618
BEE-FLOWERS	618
THE HIVE	619
COMMENCEMENT OF OPERATIONS	620
WINTER MANAGEMENT	620
HONEY-TAKING AND SWARMING	621
BEE-DRESS	623

ILLUSTRATIONS TO VOLUME II.

THE SHEEP.

1. Head of the Black-faced Scotch Sheep	<i>in Title</i>	19. Dorset Ram	<i>Page 98</i>
2. Interdigital Pit	<i>Page 18</i>	20. Exmoor Ram	101
3. The Aoudad	19	21. Welsh Sheep	105
4. Mouflon of Corsica	20	22. Cheviot	111
5. Great Asiatic Argali	24	23. Old Norfolk Ram	114
6. Rocky Mountain Sheep	27	24. Black-faced Scotch Sheep	116
7. Wallachian Sheep	35	25. Shetland Sheep	120
8. Steatopygous Sheep	36	26. Leicester Sheep	123
9. Long Fat-tailed Sheep	37	27. Lincoln Sheep	129
10. Hairy Fezzan Sheep	42	28. Romney Marsh Sheep	132
11. Merino Ram	53	29. Cotswold Sheep	134
12. Incisors at Fifteen Months	75	30. Irish Mountain or Cottagh Sheep	137
13. „ at Two Years	75	31. The Llama	155
14. „ at Three Years	75	32. The Vicuna	158
15. „ at Four Years	75	33. Thibet Goat	161
16. „ at Five Years	76	34. Front View of Sheep's Skull, Polled	175
17. „ Deceptive Appearance of, at Four Years	76	35. Profile of Sheep's Skull, Horned	175
18. Southdown Ram	93	36. Section of Skull	176

THE DOG.

1. Scotch Terrier on the Watch	<i>in Title</i>	17. The Beagle	<i>Page 265</i>
2. Group of Greyhound Puppies	<i>Page 224</i>	18. The Harrier	267
3. The Thibet Dog	228	19. The Foxhound	268
4. The Dingo	233	20. The Kennel at Goodwood	276
5. The Hare Indian Dog	236	21. The Southern Hound	278
6. The Great Danish Dog	237	22. The Setter	280
7. The Greyhound	238	23. The Pointer	281
8. The Grecian Greyhound	246	24. The Bulldog	285
9. Blenheims and Cockers	248	25. The Mastiff	286
10. The Water Spaniel	250	26. The Scotch Terrier	288
11. The Poodle	251	27. The Skeleton of the Dog	296
12. The Alpine Spaniel or Bernardine Dog	253	28. Seven Cuts Exhibiting the Front Teeth of the Dog in various Stages of Growth and Decay	334-5
13. The Newfoundland Dog	255	29. Head of Blood-hound	387
14. The Esquimaux Dog	257		
15. The English Sheep Dog	259		
16. The Scotch Sheep Dog	261		

ILLUSTRATIONS.

THE HOG.

1. Head of Boar	<i>in Title</i>	9. Phacochærus Æliani	<i>Page 402</i>
2. Skull of Hog seen from Above	<i>Page 392</i>	10. The Wild Boar	408
3. Skull of Hog seen in Profile	392	11. The Improved Berkshire Hog	464
4. Teeth of Hog	393	12. The Improved Hampshire Hog	466
5. Dentition of Babirusa	397	13. The Improved Suffolk Hog	467
6. Skull of Babirusa	398	14. The Improved Essex Hog	468
7. Babirusa	399	15. The Chinese Hog	473
8. Teeth of Phacochærus	401	16. Design of Sties, Elevation and Section	477

POULTRY.

1. Group of Fowls	<i>in Title.</i>	20. Bill of Malacorhynchus	<i>Page 583</i>
2. Cut of Gizzard of Turkey	<i>Page 500</i>	21. Bill of Gadwall	584
3. Javanese Jungle-Fowl	505	22. Bill of Pintail	584
4. Sonnerat's Jungle-Fowl	506	23. The Pintail Duck	584
5. The Game Cock	508	24. Bill of Teal	584
6. The Kulm or Malay Fowl	510	25. Bill of Mallard	584
7. The Spangled Poland Fowl	511	26. Bill of Widgeon	585
8. The Spanish Fowl	512	27. Bill of Summer Duck	585
9. Sir John Sebright's Silver Bantam	514	28. The Wild Duck or Mallard	585
10. Ovarium of Fowl	527	29. The Musk Duck	590
11. The Wild Turkey	550	30. The Common Swan	591
12. The Peacock	560	31. Head of Hooper Swan	592
13. The Guinea-Fowl	564	32. Head of Polish Swan	592
14. The Galeated Curassow	567	33. Head of Bewick's Swan	592
15. The Crested Curassow	568	34. Head of Mute Swan	592
16. The Rock-Dove	572	35. The Canada Goose	594
17. The Carrier Pigeon	577	36. The Chinese Goose	596
18. The Summer Duck	582	37. The Common Goose	598
19. Bill of Shoveller	583		

BEEES.

1. Sections of Comb—Figs. 1, 2, 3, 4, 5, 6, 7, and 8	<i>Page 606-7</i>	5. The Queen's Cell	<i>Page 611</i>
2. Proboscis of Bee	608	6. The 'Egg,' Larva, and Pupa of the Worker-Bee; and head of the Larva magnified	611
3. The Hinder Leg of Worker-bee	609	7. Sketch of Mr. Grant's Bee-Hive	620
4. The Three Descriptions of Bees of a Hive	610		

THE SHEEP.



BY W. C. L. MARTIN,

LATE ONE OF THE SCIENTIFIC OFFICERS OF THE ZOOLOGICAL SOCIETY
OF LONDON.

THE SHEEP.

CHAPTER I.

ANCIENT HISTORY AND VALUE; ITS WOOL.

AMONG the Ruminant Order of Mammalia, there is not one species, not even the ox, more intrinsically useful and important to man than the sheep; nay, perhaps there is no domestic quadruped so truly valuable. It cannot, indeed, labour like the horse or the ox, and it cannot fulfil the thousand services rendered by the dog; its importance is the result of qualities irrespective of the power of labour and docility to the yoke—irrespective of a high ratio of intelligence, courage, activity, and personal attachment. Looking at the sheep in these points of view it has nothing to recommend it; we must consider it in another light in order to feel the full force of the claims it has upon our attention and interest—claims which have been acknowledged from the earliest period of man's existence upon the globe even to the present day. No part of the sheep is destitute of utility; its flesh (termed *mutton*, by way of distinction from *beef* or *veal*, words of French origin,) graces alike the repasts of the most wealthy and the tables of the humble; it is in universal esteem, and is prepared in various methods, not only in our island but throughout the continent—we may even say the world. For the sake of their flesh vast flocks are everywhere reared; they add a charm to the most unpicturesque scenery; and their breeding, feeding, and attendance are objects of especial concern, involving the capital of agriculturalists, and the supply of the markets with one of the staple articles of animal food. Were it only for the demand of its flesh, the sheep would take a conspicuous place among the animals which Providence appears to have designed expressly for the benefit of the human species, and would divide the palm of utility with the ox. Did not the cow supply us with abundance of milk, we should, as in ancient days, drain the udders of the goat and sheep. In many parts of Europe, the ewes are as regularly milked as the cows; such was the case formerly in our island, and ewe cheeses are still made in Wales and Scotland. In many countries of Asia, the milk of the ewe and the goat, from primitive times to the present, has been preferred before that of the cow, even where cow's milk may be procured. It is from the milk of the ewe and the goat that butter is still obtained in Syria and Arabia, as is also cheese. In modern Greece a considerable quantity of cheese

is made from ewe-milk, as in the time of Homer; and in modern Europe certain celebrated cheeses are prepared from the mixed milk of ewes and goats. To this subject we have already alluded in the history of the ox; we shall not recapitulate what we have there stated, but content ourselves by observing that, as a milk-giving animal, the sheep (and the goat is included) must be regarded even in modern times as not unimportant, though, as far as Europe at least is concerned, not to the degree it was in days of antiquity.

We have already said that no part of the sheep is valueless; the horns, the bones, the intestines, and the skin, have each their respective uses. The skin of the sheep, partially tanned, and duly prepared, is used in the common sorts of book-binding; it is also manufactured into parchment, and becomes exceedingly valuable on account of its durability. Great numbers of lambskins are dressed in a peculiar way, with the wool on them, and used as furs, or made up into gloves. The people of Thibet generally cure the skins of sheep with the wool on them, and make them up into warm winter garments. The skins of lambs prepared in the same way are also greatly esteemed, particularly those of lambs either killed as soon as born, or of lambs prematurely procured by a barbarous Cæsarian operation. This is, indeed, a common practice in many parts of the East—in Tartary, Persia, Crimea, Turkey, &c. "In order," says Captain Turner, "to obtain the skin in its highest perfection, the dam is sometimes killed before her time of yeanning—a cruel precaution, which, however, secures a silky softness to the fleece, and stamps a very high price upon it in this region (Thibet), where the merit of good furs is well ascertained. It serves particularly for lining vests, and is in equal estimation over all Tartary; it bears a very high price also in China." The lambskins of Bucharia, with a curly silken fleece of silvery grey, black or bluish, are extremely valuable; and highly esteemed skins are prepared by the inhabitants of the Ukraine and Podolia. On these points, however, we shall not here enlarge; it suffices to notice them.

With respect to the intestines of the sheep, the principal article of value manufactured from them is cat-gut for stringed musical instruments.

After all, it is as a wool-bearing animal that the sheep claims our chief regard; to its fleece every class of persons, from the monarch to the rudest peasant, are alike indebted for gorgeous tissues or homely "hoddan grey." There are, indeed, many other wool-bearing quadrupeds, among which we may instance the llama, the paco, the vicugna, and the Cashmere goat, as affording wool of exquisite texture, from which costly articles of dress are manufactured; but the proportion these creatures furnish is limited as to comparative quantity "en masse." They are confined to peculiar regions, their wool is only fitted for "stuffs" of a fine tissue; it can never supersede, though bales might be brought into the market, that of the sheep. It is no less fortunate than remarkable that various kinds of wool, differing in quality, in length, in degrees of the felting property, in strength, and delicacy, are afforded by the same animal, modified by the judicious and unremitting care of man into numerous varieties, all valuable, all interesting. Hence it is, that fabrics of every texture, from the floating dress which the "dainty ladye" wears, to the splendid carpet which covers her drawing-room—from the coarse rug which defends the labourer, to the broadcloth of his lord—from the close tartan to the elastic blanket—are all, and many more beside, the produce of this species. Through how many hands, from the shearer to the wearer, does a piece of broad-cloth pass!—what occupations, what trades are not involved in these few yards of textile material!—who are not concerned in it!—and to the welfare of how many has it not contributed! Setting aside the breeder and feeder, and the great manufacturer, it has even called into requisition the skill of the engineer. Let us, in addition, take into consideration the men and vessels employed in the importation of foreign wools, and the exportation to various countries of manufactured woollen goods, and all the machinery employing capital involved in such a commerce, and it will be difficult for us to name an animal which calls so much labour into activity and capital into circulation.

We may illustrate our remarks by a few extracts from Mr. McCulloch's "Statistical Account of the British Empire," premising that we have not the means of acquiring any positive data relative to the last two or three years.

"Towards the end of the seventeenth century, Mr. Gregory King and Mr. Davenant estimated the value of wool *shorn in England* at £2,000,000 a-year, and they supposed the value of the wool, including that imported from abroad, was quadrupled in the manufacture, making the entire value of the woollen articles annually produced in England and Wales £8,000,000, of which about £2,000,000 were exported. In 1700 and 1701

the official value of the woollens exported, amounted to about £3,000,000 a-year. Owing to the vast increase in the wealth and population of the country, the manufacture must have been greatly extended during the last century, but the increase in the amount of exports was comparatively inconsiderable. At an average of the six years ending with 1789, the annual official value of exports was £3,544,160 a-year; being an increase of only about £540,000 on the amount exported in 1700. The extraordinary increase of the cotton manufacture soon after 1780, and the extent to which cotton articles then began to be substituted for those of wool, though it did not occasion any decline of the manufacture, no doubt contributed to check its progress. In 1802 the official value of the exports rose to £7,321,012, being the largest amount they ever reached till 1833, when they amounted to £7,788,842. During the five years ending with 1836, every part of the manufacture was in a state of unexampled improvement and extension, notwithstanding the price of wool was for the greater part of this period very high.

"The entire produce of English wool may be estimated at about 500,000, or 520,000 packs of 240 lbs. each; but, exclusive of this, we use large supplies of foreign wool, English wool not being suitable, without an intermixture at least with foreign, for various departments of the manufacture. Formerly the principal part of our imports came from Spain, but the late king of Saxony, when elector, introduced the Merino breed of sheep into his dominions, and exerted himself to promote their growth. His praiseworthy efforts were crowned with the most signal success. The Merino sheep seem to succeed better in Saxony and the other German states than in Spain; and since the peace of 1815, the imports from the latter have been inconsiderable compared with those of the former. The Australian colonies also have recently been rising into great importance as wool-growing countries."

According to the same eminent authority, the annual production of wool in Great Britain, at present, may be at about 490,000 packs, or 117,600,000 lbs., to which adding 30,000,000 lbs. as the average amount of imports (and this is under the mark), the whole will be 147,600,000 lbs. The value of this quantity of wool must of course vary from year to year with the variations of its price per lb., but we shall seldom be far wrong if we estimate it at a medium of about £7,500,000 a-year. "Now the best practical authorities agree in opinion with Mr. Stephenson, that the value of the finished article may be taken at about three times the value of the raw material, making on this hypothesis the entire value of the manufacture £22,500,000, which we are disposed to think is pretty near the mark."

According to the information Mr. McCulloch obtained, he considers the following statistical table of items, regarding the manufacture of woollens, as approximating to the truth:—

	£
Raw material (wool).....	7,500,000
Oil, soap, and dye stuffs, &c.	1,600,000
Wear and tear of capital, and profit	4,650,000
Wages	8,750,000
Total value of manufactured articles	£22,500,000

This is not the place to enter into the statistics of the woollen manufactures of Great Britain, we shall hereafter have occasion to revert to them; but we make these extracts merely to enforce our proposition, that it will be difficult for us to name an animal which calls so much labour into activity and capital into circulation; perhaps one may—an insect—the silk-moth.

We may here observe that wool, in early times, was accounted one of the *staple** articles of merchandise in England—a proof at once of its early commercial importance, and the superiority of the produce of the native breeds of our island.

The history of the domestic sheep commences in remote antiquity. Abel was a keeper of sheep, and “brought of the firstlings of his flock, and of the fat,” or rather perhaps the milk thereof, as a sacrificial offering on the altar. Already was the sheep domesticated, and subsequently we read of large flocks of sheep constituting a great portion of the wealth of patriarchs; these were under the care not only of servants, but even of the daughters or sons of the patriarchs, for, in those primitive days, the duties of the shepherd were deemed not inconsistent with rank or pre-eminence. Thus, “Jacob grazed his uncle Laban’s sheep;” “Moses kept the flock of Jethro his father-in-law, the priest of Midian;” and the daughters of Laban tended his flocks. The pastoral poetry of antiquity has rendered us familiar with the idea of females of birth and beauty acting as shepherdesses; nor was the duty of tending sheep accounted unworthy of gods and godlike men, princes and heroes. Carding wool, spinning, and weaving, were in those early days the employment of females of the highest rank. “She seeketh wool and flax, and worketh willingly with her hands.” “She perceiveth that her merchandise is good.” “She layeth her hands to the spindle, and her hands hold the distaff.” “She is not afraid of the snow

for her household, for all her household are clothed with scarlet.” “She maketh herself coverings of tapestry.”—*Prov.* xxxi., 13, 18, 19, 21, 22. The Scriptural records, in fact, abound in descriptive passages which prove that the conversion of the fleece into woollen tissue, and that too of different colours, the wool or the yarn being previously dyed, was one of the ordinary domestic occupations of females in Syria. Weaving is indeed an art of great antiquity; Job says, “my days are swifter than a weaver’s shuttle,” and in Deuteronomy xxii., 11, we read this commandment, “Thou shalt not wear a garment of divers sorts, as of woollen and linen together.” Moses speaks expressly of fine linen, and of the women spinning, both of blue, and of purple, and of scarlet; and of fine linen; and also of goats’ hair being spun. He speaks, moreover, “of the embroiderer in blue, and in purple, in scarlet, and in fine linen, and of the weaver.”—*Exodus* xxxv.

These and other passages prove not only that the art of spinning and weaving, but of dyeing also, was practised in remote antiquity. The fine linen of Egypt was celebrated; and it would appear that they also spun and wove wool. Herodotus says, that “the women in Egypt are employed in trade or business, while the men stay at home and spin and weave. They wear garments of linen, first washed, taking care to have them clean.” “The priests are clothed in linen, wear shoes of linen, and are not permitted to dress in any other manner.” Elsewhere, speaking of the Egyptians generally, he says, “They wear a linen tunic, bordered at the bottom with fringes, and a cloak of white woollen cloth over it; but to enter into any temple with this garment, or to be buried in anything made of wool, is accounted profane.” How are we to reconcile this with the fact of a strong thick felted covering of wool, dyed with a pattern of various colours, being found on the body of a mummy from Thebes, which was examined some years since at the rooms of the London Zoological Society, in Bruton Street? We ourselves assisted in unswathing the mummy, and long possessed a small portion of the felted cloth. At all events this is sufficient to prove that the art of felting was known to the Egyptians; and it is not improbable, that the first woollen garments used by the nomadic feeders of flocks in Syria and Arabia were of felted wool. Certain it is, that from the earliest times wool has been known to possess the property of felting. Pliny observes, that wool of itself, driven into a felt, without spinning or weaving, serves to make garments; and that if vinegar be used in the working, such felts are proof against the edge or point of a sword, and are capable of arresting the progress of fire. Mantles and counterpanes of felt were used at Rome.

* The word *staple*, or *estaple*, is derived from the French word *Estate* (now written *Etape*), which signifies a market or public place of sale; or rather from the Teutonic *Stapel*. In England all merchandise sold for the purpose of exportation, was compelled either to be sold at the staple, or afterwards brought there before exportation (2 Edward III., c. 9.) This was done with the double view of accommodating the foreign merchants, and of enabling the duties on exportation to be collected with certainty and convenience. In process of time the word *staple* began to be applied to the merchandise itself, sold at these authorized markets, viz. wool, sheepskins, leather, lead, and tin; articles of exportation.

If we turn to the pages of classic antiquity, we find gods and princes occupied as shepherds, and queens engaged in the work of the loom. The fabulous contest of Minerva and Arachne has been celebrated by Ovid; Homer paints both Helen and Penelope as devoted to the loom; and, at a far later period, the ladies both of Greece and Rome wrought woollen stuffs for garments, as well as "coverings of tapestry"—not, indeed, that the distaff and the loom were exclusively under the patronage of the higher ranks; for, although Augustus wore a dress manufactured by his wife and female relatives, the humblest female plied the same task, and the peasant's garment was spun and wove by the females of his lowly abode. Many, indeed, procured a livelihood by manufacturing cloth; and Virgil thus describes an honest, industrious, but humble matron, who laid "her hands to the spindle:"—

"Cum femina primum
Cui tolerare colo vitam, tenuique Minervā,
Impositum cinerem, et sopitos suscitāt ignes,
Noctem addens operi, famulasque ad lumina longo
Exercet penso, castum ut servare cubile
Conjugis, et possit parvos educere natos."
VIRGIL, *Æn.* lviii.

LITERAL TRANSLATION.

"What time the housewife,
Whose concern it is to work for bread at her distaff and humble loom,
Stirs up the heaped-up ashes and the dormant fire,
Adding night to her labour, and by taper-light urges her maids
To their tedious task, that she may preserve inviolate her husband's bed,
And be enabled to bring up her little sons."

To add more on this subject would be to repeat a thrice-told tale; suffice it to glance at the esteem or respect in which the shepherd's occupation was held, in ancient times, by all people excepting the Egyptians,—and the general employment of females in spinning and weaving, from the highest to the lowest, from those who worked for amusement to those who toiled from necessity, either in order to clothe their family, or to procure a living.

From Homer to Virgil poets have combined to throw an air of almost romance around the shepherd's useful and peaceful occupation. They have painted the shepherds as leading not driving, their sheep, and piping their "oaten straws," while, seated in the shade, they watched their fleecy charge; and though they say little of the rough work which necessarily devolves on the "keeper of sheep," their pictures, though perhaps over-coloured, are true in the main. Lady Mary Wortley Montagu, writing from Adrianople, after noticing the *fistula* of unequal reeds, in common use as a musical instrument among the peasantry, says, "Mr. Addison might here make the experiment he speaks of in his travels, there not being one instrument of music among the Greek or Roman statues that is not to be found in the hands of the

people of this country. The young lads generally divert themselves with making garlands for their favourite lambs, which I have often seen painted, and adorned with flowers, lying at their feet, while they sung or played. It is not that they ever read romances, but these are the *ancient* amusements here, and as natural to them as cudgel-playing and foot-ball to our British swains. * * * I no longer look upon Theocritus as a romantic writer; he has only given a plain image of the way of life amongst the peasants of his country."

In looking at the sheep as one of the most valued domestic animals of antiquity, it strikes us that there are several points connected with its culture and treatment in early ages, which may not be altogether devoid of interest.

We have said that the shepherds are described as leading not driving their sheep, and we may add, that they gave them distinct names. To these circumstances a beautiful allusion is made by the Great Shepherd. "He calleth his own sheep by name, and leadeth them out; and when he putteth forth his own sheep he goeth before them, and the sheep follow him, for they know his voice; and a stranger they will not follow."—*John*, x., 3, 4, 5, in part. Dr. Kitto, commenting on these passages, says, "It would seem that the Jews, like the Arabians, gave names to their sheep, by which they they called them to drink or to be milked." This necessarily implies that the shepherd could distinguish individually the sheep of his flock; and, however strange this may seem, it is possible and true; for it is known that shepherds, particularly in the East, can and do distinguish thus the individuals in even very large flocks. The pastoral custom here alluded to, of giving names, for distinction, to particular sheep, was by no means confined to the East; it was usual, also, among the shepherds of Greece. Thus, Theocritus (*Idyl.* v., 103-4) makes the shepherd Lacon address some of his flock by name; desiring two, Conarus and Cynothe, to leave the oak, and feed, like Phalarus, towards the rising sun. These significant names are two of them masculine and one feminine, showing that the ewes as well as the rams were distinguished by proper names. It might easily be shown, by extended citations, that the custom was of very extensive application—that names were given to almost all domestic animals, as usually we give names to dogs and horses.

In ancient times the intimacy, so to speak, between the shepherd and his sheep was more close than it is at present, at least in most parts of Europe; nevertheless, the practice of giving names to sheep, and of teaching them to come when called, is not yet extinct in Greece and Western Asia. The Rev. J. Hartley ("Researches in Greece and the Levant") says, "I asked my man if it was

usual in Greece to give names to sheep. He informed me that it was, and that the sheep obeyed the shepherd when he called them by their names. This morning I had an opportunity of verifying the truth of this remark. Passing by a flock of sheep I asked the same question which I put to my servant, and he gave me the same answer. I then bade him call one of his sheep, he did so; it instantly left its pasturage and companions, and ran up to the hand of the shepherd with signs of pleasure, and with a prompt obedience which I had never before observed in any other animal. The shepherd told me that many of his sheep were still *wild*; that they had not yet learned their names, but that by teaching they would all learn them. The others which knew their names he called *tame*." When the flock, as was often the case in the earlier ages, was very numerous, it is not to be supposed that every sheep was, as the Greek shepherd said, rendered *tame*; it would suffice that a few of the leaders, the rams of the flock, should be so instructed; for so remarkable is the principle of imitation in this animal, that where one goes the flock all follow; and thus, one or two obeying the shepherd's voice, will, as it were, over-rule the actions of the rest. It is thus that the shepherds manage their flocks in some parts of France. "They select certain sheep from the flock, they give them particular names, and teach them to come when they are called. In order to accustom them to this, they make the sheep follow them by offering them a piece of bread. When the shepherd wishes to lead his flock through a defile, or to make them change the direction in which they are proceeding, he calls to him one of these selected sheep; those that are nearest to him immediately follow, and the others are not far behind; so by degrees the whole flock are disposed to obey the call of the shepherd, and to follow him."—*Instructions pour les Bergers*, p. 15.

Dr. Kitto well observes, that the term "voice" (*φωνή*) is applicable to any sound, and when applied to a shepherd leading his flock, may mean not only a call in the natural voice, but any other, such as by a pipe or whistle. We may add, that in mountainous countries or wild districts, over which the flocks wander dispersed asunder, the use of the pipe or horn has been known and practised from a very early period, the sheep obeying the signal-notes to which they have been taught obedience. In ancient times the shepherds were more musical than in these degenerate days, and are said to have ruled their flocks by their Pandean strains. As they played their simple airs the sheep would follow, or they would collect at a signal call. In many parts of the Alps, and in certain provinces in France, the shepherd and his pipe continue with true antique simplicity. The flock is regularly penned every evening to

preserve them from the wolf; and the shepherd returns homeward at sunset with his sheep following him, and seemingly pleased with the sound of a pipe, which is blown with a reed, and resembles the chanter of a bagpipe. The horn, of rude make and shrill tone, resounding far, is a very common instrument for calling sheep and cattle, being admirably adapted for mountain ranges and extensive pasture lands. Its use in ancient times was well known. Polybius, writing of the island of Corsica, observes, that "as the island is rugged and rocky, and also covered with woods, the shepherds are not able to follow their flocks into the places wherein they are dispersed; but when they have found a suitable pasture, and are desirous of bringing them together, they sound a trumpet: upon this signal the whole flock immediately run together and follow the call of their own shepherd, never mistaking one for another. Thus it happens, that when strangers come upon the island, and attempt to lay hold of the goats, or oxen, which they see feeding by themselves, the cattle, unused to the approach of strangers, immediately take to flight; and then, if the shepherd, perceiving what has happened, sounds his trumpet, they all run towards him with great haste. That the cattle," he adds, "should be thus obedient to the sound of a trumpet is no very wonderful thing." In Italy those who have the care of swine never enclose them in separate pastures, nor follow them behind, as is the custom among the Greeks, but go always before them, and from time to time sound a horn. The swine follow and run together at the sound, and are so taught by habit to distinguish their own proper horn, that their exactness in this respect seems almost incredible to those who have never heard of it before.

In modern days the herdsmen of the Alps use the horn in collecting cattle, and in Lithuania and Muscovy the herdsmen and shepherds lead their cattle, horses, and sheep, by the sound of the horn, both to pasture and to water, and again direct their course home, each part of the business having its definite signal. In Sweden and Iceland the shepherds use horns made of birch-wood. Two excavated or channelled pieces are fitted together, and bound tightly round with bark of the same tree, so as to form a pipe or tube, producing a shrill sound.

Dr. Kitto, commenting on the passages of Holy Writ to which we have above alluded, observes, that "the Hebrew shepherds did not, like ours, follow the flocks, driving them along, but attracted them to follow by a call, the animals knowing the person of their shepherd, and being aware of what his call intimated. The same custom," he adds, "is still observed in the East, and in some parts of Europe, in application to herds as well as flocks. It exists in Spain, having been probably introduced by the Arabs, and is also

found even in Russia, in the villages of which we have often, of a morning, seen a peasant marching through the street, playing on a pipe, on the hearing of which the animals came forth from their various cottage homesteads, following him to the pastures. They are brought home in the evening and called to be milked in the same manner. A vocal whistle, or any peculiar sound of the human voice, might, and probably did often, answer the same purpose."—*Pictorial Bible*, iii., p. 215.

This ancient mode of leading the flock, and of calling the sheep together by means of the sound of a horn, or other call, suggests a query as to the character and use of the sheep-dog. It may, indeed, be asked, was the sheep-dog anciently known? Our sheep-dog is a dog for driving sheep and for collecting flocks, and Buffon regards it as one of the primitive, or rather the primitive form of the species. Now, the ancients possessed sheep-dogs, but they were not used for driving sheep, but for defending the flock; they were large, fierce, powerful animals, employed to defend their charge against the attacks of ferocious beasts; they were on friendly terms with the flock, and regarded as protectors, but in other respects were not used; they were guardians and sentinels. Job (ch. xxx., v. 1), speaks of "the dogs of his flock;" and Isaiah (ch. lvi.), in figurative language, speaks of "dumb dogs that cannot bark," of "greedy dogs, which can never have enough," and of "shepherds that cannot understand." The ancient classic poets never describe the sheep-dog as we have it; that is, as a driver and collector of sheep; so that Buffon's idea respecting its primitiveness, seems to us to be based upon no real foundation. The ancient sheep-dog was a watch-dog,—he guarded the flock; he gave warning to the shepherd; he combated the wolf; and such still is the sheep-dog over a great portion of Europe, and in Asia generally. The huge dogs of Thibet are guardians of the fold. They are peculiar to the table-land of the Himalaya mountains about Thibet, and are bred by the Bhoteas, a singular race of people, who till the ground, keep sheep, and at certain seasons come down to trade, bringing borax, tincal, and musk for sale. Mr. Moorcroft, in his Journey to Lake Manasarovara, observes that the Uniyas guarded their flocks with fierce dogs, which were much disposed to attack strangers. In Spain, where the sheep are led by the shepherd, the folds are guarded by powerful dogs, capable of contending with the wolf. The shepherds of the Abruzzi, a mountainous district in the kingdom of Naples, employ a white long-haired breed of dogs, equal to a Newfoundland dog in size, for the purpose of protecting the flock against wolves, which are very numerous. In like manner the ancient shepherds of Italy guarded their flocks; and Virgil

gives the following injunction to the keepers of sheep:—

"Nec tibi cura canum fuerit postrema, sed unâ
Veloces Spartæ catulos, acremque Molossium
Pasce sero pingui; nunquam custodibus illis
Nocturnum stabulis furem, incursusque Luporum
Aut impacatos a tergo horrebis Iberos."

LITERAL TRANSLATION.

"Nor let the care of your dogs be the last; but at once
The swift dogs of Sparta, and the fierce Molossian,
Feed with rich whey; never, these being your guards,
Will you dread the nightly robber in your pens, or the incursions of wolves,
Or the restless Iberians coming upon you by stealth."

Wherever the wolf and other beasts of prey of large size exist, the dog is requisite as their guard, and has been so from the earliest ages. Augustin Gallo (*Les Secrets de la vraie agriculture*, traduits par François de Belle-Forêt), recommends that these dogs should be white as well as powerful, like those of the shepherds of the Abruzzi, in order that they may be the better seen by their masters when fighting at night with the wolf, and so not be liable to be shot by mistake. It is in reference to the dog as a faithful defender of the fold, that the Abbé Delille thus writes:—

"Aimable autant qu' utile,
Superbe et caressant, courageux et docile,
Formé pour le conduire et pour le protéger
Du troupeau qu' il gouverne, il est le vrai berger;
Le ciel l'a fait pour nous;—et dans leur cour rustique
Il fut des rois pasteurs le premier domestique."

With regard to the general treatment of the sheep in the early ages, we can only glean information from scattered notices. Flocks formed the chief wealth of the patriarchs; we are told that the flocks and herds of Abraham and Lot were so great, that "the land could not bear them." The spoil of the Midianites, besides gold and silver, consisted of six hundred and seventy-five thousand sheep, and threescore and twelve thousand beeves, and threescore and one thousand asses.—*Numbers*, xxxi., 32, 33, 34. The tribes of Reuben and Gad made war upon the Hagarites, and took away their cattle, "of their camels fifty thousand, and of sheep two hundred and fifty thousand!"—1 *Chron.*, v., 21. Solomon, at the "great temple's dedication," offered "a sacrifice of twenty and two thousand oxen, and a hundred and twenty thousand sheep."—2 *Chron.*, vii., 5. These and many other passages prove the abundance of sheep anciently pastured in Syria. Excepting for the purpose of sacrifice they were seldom killed, and it would appear that the ewes generally produced twins; consequently, their annual increase must have far overbalanced any losses. As the flocks exhausted one extent of pasturage, they were conducted to another, themselves and their patriarchal owners being necessarily migratory; and even when cities were built, when the population, no longer a nomade race living in tents, inhabited crowded towns, still the sheep and their shepherds

must have continued their pristine habits. Such a shepherd was David, destined to become the monarch of Israel. We find, that being sent with parched corn, and loaves, and cheese, to his brethren in the army of Saul, that he left the sheep with a keeper in the wilderness—his father's sheep, which he kept, and in the defence of which he had slain a lion and a bear. In order to supply the flocks and herds with water on the plains of Syria and the wilds of Arabia, wells were dug at different stations, from which the drinking troughs were supplied. Such was the well of Haran. "He looked, and beheld a well in the field; and, lo! there were three flocks of sheep lying by it; for out of that well they watered the flocks, and a great stone was upon the well's mouth: and thither were all the flocks gathered; and they rolled the stone from the well's mouth, and watered the sheep, and put the stone again upon the well's mouth in its place."—*Genesis*, xxix., 2, 3. The use of the stone over the well was evidently intended as a means of preventing the pit from becoming choked up with dust or drifting sand, and was removed only at certain times, and carefully replaced. Sometimes these wells were filled up by a vindictive enemy; often contests between the herdsmen of different masters occurred, each striving for exclusive possession of the well; * and sometimes forcible possession was taken by parties who had no claim to the well, and who had not dug it. Thus, we are told that "Abraham reproved Abimelech because of a well of water, which Abimelech's servants had violently taken away; and Abimelech said, I wot not who hath done this thing; neither didst thou tell me, neither yet heard I of it but to-day." To end all dispute, and cement a mutual friendship, Abraham gave sheep and oxen to Abimelech, and purchased the exclusive right to the well which he had dug, or ratified their mutual covenant, with seven ewe lambs. He then called the well "The Well of the Oath," or, "Beersheba." Few changes have taken place in the manners and customs of the wandering tribes of Syria and Arabia. Bruce informs us, that having obtained, at a place called Shekh Ammer, from the Arab Shekh, a pledge of protection and good faith, the people sent down to his boat two bushels of wheat and *seven* sheep, which was apparently in ratification of the treaty. "That there was something particular in the number of seven, in connection with the oath, would seem from the fact that the word for *oath* (*sheba*, as in *beer-sheba*) also means *seven*."—*Dr. Kitto*.

Many travellers have described the migratory movements of the Arabs, with their flocks of sheep and goats, as strongly reminding them of the wanderings of the patriarchal shepherds. Parson, in his "Travels from Aleppo to Bagdad," thus

describes the march of a horde of Arabs:—"First went the sheep and goats in regular divisions; then followed the camels and asses, loaded with the tents, furniture, and kitchen utensils. These were followed by the old men and women, and the boys and girls, on foot; the children that could not walk were carried on the backs of the young women and the boys and girls; and the smallest of the lambs and kids were carried under the arms of the children. The procession was closed by the chief of the tribe, mounted on the very best horse, and surrounded by the heads of each family all on horses, with many servants on foot."

Dr. Kitto, in a note on *Genesis*, xxxi., 17, 18, relative to the migration of Jacob, says, "A very prominent and interesting part of oriental usages consists in the different forms of travelling and migration, in which little alteration seems to have taken place since the most early times, the usages of which are briefly indicated in the book of *Genesis*. It is impossible for one who is acquainted with the Bible, to witness the migration of a nomade tribe, whether Arabian or Tartar, without being forcibly reminded of this journey of Jacob, and the various removals of his grandfather and father. The degree of change probably extends little further than to the more warlike character which the tribes now assume in their journeys, arising from the increase of population, and from the extension of the aggressive principle among the children of the deserts. In a quarter of the time in which it would take a poor family in England to get the furniture of a single room ready for removal, the tents of a large encampment will have been struck, and, together with all the moveables and provisions, packed away upon the backs of camels, mules, or asses; and the whole party will be on its way, leaving, to use an expression of their own, not a halter or a rag behind. The order of march, in the removal of a pastoral tribe or family, seems to be just the same as that which may be traced in the next and ensuing chapter (*Genesis*, xxxii., xxxiii.) When the number of animals is considerable, they are kept in separate flocks and droves, under the charge of shepherds and herdsmen, or of the young men and women of the tribe, who hurry actively about, often assisted by dogs, to restrain the larger and more lively animals from straying too far. The very young or newly-born lambs and kids are carried either under the arms of the young people, or in baskets or panniers thrown across the backs of camels. To this custom of carrying the lambs in the arms of the shepherds, as well as to the necessity mentioned by Jacob (*Genesis*, xxxiii., 13) of driving slowly when the sheep are with young, there is a beautiful allusion in *Isaiah* (ch. xl., 11), 'He shall feed his sheep like a shepherd; he shall gather the lambs with

* See *Genesis*, xiii., 7, and xxvi., 20, 21.

his arm, and carry them in his bosom, and shall gently lead those that are with young.' The sheep and goats generally lead the van, and are followed by the camels, and, perhaps, asses, laden more or less with the property of the community. The laden beasts are usually followed by the elderly men, the women, and the children, who are mostly on foot in the ordinary migrations with their flocks; which must be carefully distinguished from a caravan journey or a predatory excursion across the deserts. The very young children are carried in the arms or on the backs of their mothers, who in general are on foot, but are sometimes mounted, with the infants, on the spare or lightly laden beasts. A day's stage, with numerous flocks, is necessarily short, and the pace easy; it must not be confounded with a day's journey by the caravan. Thus Jacob says, 'I will lead on softly, according as the cattle that goeth before me, and the children, be able to endure,' or, more strictly, 'according to the foot of the work, and according to the foot of the children.'

From several expressions in the Scriptures we glean that sheep in the East were anciently folded; the first notice occurs in Genesis, xxxiii., 17: "And Jacob journeyed to Succoth, and built him a house (or erected a tent), and made booths for his cattle." David "comes to the *shepcotes* by the way, where was a cave."—1 *Samuel*, xxiv., 3. "I took thee from the shepcote from following the sheep."—2 *Samuel*, vii., 8. The tribes of Reuben and Gad, when they saw the land of Jazer, and the land of Gilead, and found it "a place for cattle," said, "We will build sheepfolds here for our cattle, and cities for our little ones."—*Numbers*, xxxii., 16. Hezekiah possessed storehouses for corn, wine, and oil, "and stalls for all manner of beast, and *cotes* for flocks."—2 *Chron.*, xxxii., 28. These *cotes* or folds were more used by the shepherds in the neighbourhood of towns and cities, most probably, than by the nomade tribes; and, doubtless, natural caves often were used, as at present in Persia, for the nightly shelter and security of the flock, as well as artificial enclosures. Homer, in the *Odyssey*, represents Polyphemus as driving his flock at eventide into a cave, which served as a rude sheep-cote. Virgil directs the sheep to be kept housed in *cotes* during the severities of winter:—

"Incipiens, stabulis edico in mollibus herbam
Carpere oves, dum mox frondosa reducetur aestas
Et multa durum stipulâ, filicunque manipulis
Sternere subter pumum; glacies ne frigida lædat
Molle pecus, scabiemque ferat, turpesque podagras."

LITERAL TRANSLATION.

"To begin, I direct the sheep to be foddered in snug stalls
Till the first return of leafy summer,
And that the hard ground underneath them be strewed
With plenty of straw, and bundles of fern, lest the cold ice
injure
The tender flock, and bring on the scab, or foul diseases of the
feet."

Subsequently he says, "But when the glad summer comes, the Zephyrs inviting, let us send forth to feed both flocks, that is, of sheep and goats, into the lawns and pastures; let them crop the cold field with the star of Lucifer rising, while the morning is new, and the dew, so grateful to the flock, is on the tender grass; then, as soon as the fourth hour of the day shall have brought on thirst, while the querulous cicadæ are rending the groves with their song, order the flocks to drink at the wells or deep pools, or of the water running in oaken troughs; but, in the noontide heats, let them seek out an umbrageous valley, where Jove's mighty oak of ancient wood extends its huge boughs; or wherever a grove, dark with thick ever-green oaks, is stretched out with its sacred shade. Then give them once more the limpid streams, and feed them at the setting of the sun, when cool Vesper tempers the air, and the shores resound with the Halcyon, and the bushes with small warblers."—See *Georg. iii.*, l. 322, et seq.*

Two points are worthy of notice in these directions, which, though clothed in poetical language, were seriously intended: first, the custom of "battening the flocks with the fresh dew of night" before the sun has exhaled them; and, secondly, the practice of sheltering them during the noontide heat in some shady spot. So Varro says, "About the midday heat, until it grows cool, let them repose under shady rocks, or broad-spreading trees, and feed again at sunset." This custom was common in all the warmer countries; thus, in the Song of Solomon, "Tell me where thou feedest, where thou makest thy flock to rest at noon."—i., 7.

The flocks of antiquity consisted of goats as well as sheep, and the same care was paid to the former as to the latter. Virgil says, that though the value of the Milesian fleece (Miletos, a city of Ionia, famous for its wool, and fine woollen manufactures), dyed with Tyrian scarlet, is very considerable, yet that goats are equally as profitable as sheep, and yield a greater quantity of milk. He directs, moreover, the shepherds to shear the

* After giving these directions to the Italian shepherds, Virgil describes the pastoral tribes of Libya, which live in scattered huts (*mapalia*), and feed their flocks, both day and night, for a month at a time without placing them under shelter, depasturing them in extensive deserts; as the African shepherd follows them, he carries all with him,—his arms, his house, his household god, his Amyclæan dog, and Cretan quiver. This pastoral life in a genial climate contrasts strongly with that in cold regions, where the winter is excessively severe and very long, as it is on the borders of the sea of *Azof* and in the country of the *Danube*:

"Not so the Scythian shepherd tends his fold,
Nor he who bears in Thrace the bitter cold,
Nor he who treads the bleak *Mæotian* strand,
Or where proud *Ister* rolls his yellow sand:
Early they stall their flocks and herds; for there
No grass the fields, no leaves the forests wear,—
The frozen earth lies buried there, below
A hilly heap, seven cubits deep in snow,
And all the west allies of stormy Boreas blow."

DRYDEN'S *Virgil*, *Georg. iii.*, l. 349, et seq.

beards and long hair of the Cinyphian goats (an African breed) for the service of the camp and garments for sailors. We read that curtains of goats' hair were commanded to be made as a covering for the tabernacle (Exod., xxvi., 7); and several allusions are subsequently made to the spinning of goats' hair, and to the curtains made of this material. In the East, from the earliest ages, breeds of goats clad with mingled hair and wool have existed. The Cashmere goat is still celebrated,—as is also the Angora breed of Asia Minor. We need not say that the kid, like the lamb, was anciently accounted a delicacy; nor that also, like the latter, it was offered in sacrifice upon the altar. The early history of the goat is interwoven with that of the sheep, and we have reason to believe that the latter animal was horned.

The practice of divesting the sheep of their wool by shearing, must have suggested itself very early to the shepherds of primitive days. Like the clothing of other animals, the wool is naturally shed during the warmer months when the fleece becomes a burden, and the new wool begins to spring underneath the old; it comes off in flakes, tufts, or masses; and the flock, wandering among brushwood or thorny bushes, leave great portions of it, as they pass along, intertangled with the twigs and branches. At this juncture the old wool is easily disengaged by slightly pulling it; and its detachment causes no pain. Among many of the nations of antiquity it was in this manner that the sheep were divested of their fleece; but much was probably lost, and much spoiled. This practice is not unknown in modern Europe, or at least was so till very recently. In Iceland, according to Gill ("Technological Repository," ii., p. 18), the sheep are not shorn, but the wool when loose is pulled off by the hand. Mr. Low, in his *Fauna Orcadensis*, says, that in Orkney, "about midsummer, there is a particular day published for *rowing*, when all the men in the parish attend with their dogs, turn out and drive the whole flock, without any preparation of washing, into narrow pens, and from thence, I may say, to the place of execution, where the wool is torn off their backs—an operation which brings the whole blood into their skin, and is not only disgusting, but, if the season is harsh, is the cause of great destruction. But however cruel it may seem, it is almost the only notice that is taken of these useful animals by their unfeeling masters until that time twelvemonth." Since the time when Low wrote the Orkney Islands have become greatly improved, and a stimulus to agriculture has been given in consequence of a regular steam communication with Aberdeen and Edinburgh. Ponies and cattle are now abundant; extensive fisheries are carried on; and the kelp

manufacture is almost if not quite extinct. The people are intelligent and educated, there being few parishes which have not two schools; and Low's account of *rowing* sheep might be now read with surprise by the Orkney farmer.

Among the Greeks it was the practice, in the time of Hesiod, to shear sheep. Hesiod was contemporary, it is supposed, with Homer. The Greek terms *ἐριον*, wool, from *εἶρω*, to weave, inter-twist, or net; *ποκος*, a fleece, from *πείκω*, to comb or card; *κρόδιον*, fleece, and *μαλλος*, a fleece, from *μαλον* or *μηλον*, a sheep (opes quæ erant apud veteres oves), have no allusion to the practice of rowing or pulling away the wool; on the contrary the Latin word *vellus*, fleece, is derived from *vello*, to tear away; and in early times, the *mos vellendi*, the practice of pulling away the fleece, was common in Italy. That part of the Palatine Mount called Velleia, and the adjacent quarter called Velina, were, it is said, originally so named because it was there that the shepherds anciently *rowed* their sheep—(quod ibi pastores Palatini vellere lanam sint soliti); and the term Palatine itself is asserted by some to be derived "a balatu pecoris," from the bleating of sheep. Even in Pliny's day, as he informs us, the sheep were not shorn everywhere in Italy; for the custom of pulling off the wool still continued in some places, the sheep being kept fasting for three days previously to the operation, in order that, the poor animals being weakened and exhausted, the roots of the wool might be the more easily detached. We do not remember that Virgil anywhere alludes to this disgraceful practice, though he does to *shearing*; perhaps by his silence he wished to show his aversion towards it, and, besides, he might feel that so inhuman a custom would not bear introduction either into his *Bucolics* or *Georgics*.

Among the patriarchal shepherds we hear only of the practice of shearing. We read that "Judah went up unto his sheep-shearers to Timnath."—*Genesis*, xxxviii., 12. "And there was a man in Maon, whose possessions were in Carmel, and the man was very great; and he had three thousand sheep, and a thousand goats, and he was shearing his sheep in Carmel."—1 *Samuel*, xxv., 2. There were, moreover, shearing houses, with pits for washing the sheep, and the shearing time was one of festivity and rejoicing. Absalom prepared an entertainment at the shearing place, to which he invited Ammon and slew him when his "heart was merry with wine." Nabal prepared a feast for his shearers, and from the provisions Abigail took two hundred loaves, and two bottles of wine, and five sheep ready dressed, and five measures of parched corn, and a hundred clusters of raisins, and two hundred cakes of figs, as a propitiatory offering to David. The gathering in of the vintage and the harvest, and the conclusion of the sheep-

shearing, have in all times been regarded as seasons of rejoicing. Burder, in his "Oriental Literature," says that Cærops, the founder of the kingdom of Athens, "ordained that the master of every family should after harvest make a feast for his servants, and eat together with those who had taken pains together with him in tilling the ground." This custom once prevailed in our island: we formerly kept harvest-home in a style of true hospitality, but "old times are changed, old manners gone," and the custom is passing into desuetude. It does not appear, as far as we can learn, that the Israelitish shepherds ever clothed their sheep, nor that it was practised in Italy. It would, appear, however, that this custom prevailed in some parts of Greece. "Pursuing our walk (in the neighbourhood of Athens)," says Anacharsis the younger, "we passed a numerous flock of sheep, preceded and followed by dogs to drive away the wolves; a covering of skin was wrapped round each sheep. This practice, which has been borrowed from the Megareans, defends the wool from the filth which might otherwise defile it, or prevents it from being torn by the hedges. I know not whether it contributes to render the wool finer, but I can affirm that the wool of Attica is extremely fine." In some countries this practice, to a certain extent, still prevails. According to Dr. Anderson, the inhabitants of the Ukraine and Podolia, when a prettily-marked lamb is born, sew it up in a sort of vest fitted so closely that it presses the curls of wool to the skin. This vest is enlarged as the animal grows, and is also wetted every day with warm water. The wool thus treated forms into ringlets which remain permanently in curl, and the animal is killed at an earlier or later period, according to the material intended to be produced, viz. whether a short, glossy nap for ornamental purposes, or a thicker and longer nap; for warm winter clothing. Though we call the sheep in its state of domestication a wool-bearing animal, we must not forget that many breeds are covered with a mixture of wool and coarse hair, the latter predominating. To this point, and to others connected with the original wild state of this animal, we shall hereafter advert; all we wish to observe here is, that its improvement as a wool-bearer appears to have been not only rapid, but to have commenced in remote antiquity. We have already alluded to the shearing of sheep in patriarchal times. These sheep were not all white; some were brown or black, and some particoloured. We need scarcely allude to Laban's agreement with Jacob, that the latter should keep as his own property all the ring-straked, speckled, spotted, and brown produce of the flock which he fed, but we may observe that in the sheep generally there is a tendency to revert from white to a dark colour, and to acquire spotted markings about the limbs and head; and, indeed, on some of our

own breeds the head and limbs are brown. This tendency was not unnoticed by the Roman writers, and hence Virgil directs that if woollen manufactures be the breeder's aim, the flocks chosen should have white soft fleeces; and that a ram, though he be himself of the purest white, under whose moist palate a black tongue lurks, must be rejected, lest he should sully the fleeces of the lambs with dusky brown spots.

It was, then, in times of antiquity, as in modern days, that the sheep was valued for its fleece; the goat was hardier and perhaps gave more milk, but the fleece of the sheep rendered it peculiarly valuable. We have seen that in ancient days it was felted into stuff, spun and woven into cloth, and that some breeds were noted for the fineness of their wool. Hair and wool are not mere modifications of each other, for most quadrupeds have both wool and hair for their clothing; but the preponderance of the one over the other differs materially in various species, and may be altered by climate and other influencing causes. Abundance of wool is mixed with the hair of the camel, the deer, the bison, and the aurochs; even the feline race are not destitute of it: it abounds in the fur of the hare, the beaver, the musquash, the arctic fox, the chinchilla, and other animals, but is more or less overlaid by hair. Wool felts; now hair, however long, fine, or delicate it may be, does not possess the felting quality. In what, then, consists the property of the one, and the absence of it in the other? In structural peculiarities.

Many are the theories upon which writers have attempted to account for the felting of wool—the attraction of cohesion; the elasticity of the fibres bent in every direction, and prevented from returning to their original length by the adhesion of other fibres; the property which certain hairs and vegetable filaments have of attaching themselves more and more to each other, in proportion as the fabric into which they are united is beaten, the fibres entangling each other in circles, and by their elasticity striving to return to their original condition; these, and modifications of similar theories, were accepted as a sufficient explanation. M. Monge was the first who ventured to assert that a barbed or feathered edge must be the structure of the surface of wool; that the surface is formed of lamellæ, or little plates, which cover each other from the root to the point, as the scales of a fish or the back scales of a snake; and on this theory, the truth of which M. Monge assumes, he explains the mechanism of felting as actually as though he had himself seen the serrations or scales on the surface of the fibre. It was reserved for the late eminent veterinarian, Mr. Youatt, to demonstrate the peculiarity in question. Mr. Youatt thus announces his discovery:—"On the evening of the 7th of February, 1835, Mr. Thomas

Plint, woollen manufacturer, resident at Leeds; Mr. Symonds, clothing agent, of Cateaton Street, London; Mr. T. Millington, surgeon, of London; an esteemed friend, Mr. E. Brady, veterinary surgeon, at that time assisting the author in his practice; Mr. W. H. Coates, of Leeds, veterinary pupil; Mr. Powell, the maker of the microscope; and the author himself (Mr. Youatt), were assembled in the parlour. A fibre was taken from a Merino fleece without selection, and placed on the frame, to be examined as a transparent object. A power of 300 (linear) was used; and, after Mr. Powell, Mr. Plint had the first ocular demonstration of the irregularities in the surface of the wool, the palpable cause of the most valuable of its properties, its disposition to felt. The fibre thus looked at assumed a flattened ribbon-like form; it was of a pearly gray colour, with faint lines across it; the edges were evidently hooked, or, more properly, serrated; they resembled the teeth of a fine saw. These were somewhat irregular in different parts of the field in view, both as to size and number. The area of the field was one-fortieth of an inch in diameter. By means of a micrometer we divided this into four, and we then counted the number of serrations in each division. Three of us counted all four divisions, for there was a difference in some of them. The number was set down privately, and it was found that we had all estimated it at fifteen on each division. Having multiplied this by four, in order to obtain the whole field, and that by forty, the proportionate part of an inch of which the field consisted, we obtained as a result that there were 2400 serrations in the space of an inch, all of which projected in the same direction, viz., from the root to the point." The diameter of the fibre was ascertained to be 1-750th of an inch. "We next endeavoured to explore the cause of this serrated appearance, and the nature of the irregularities on the surface which might possibly account for the production of these tooth-like projections. We therefore took another fibre, and mounted it as an opaque object." After some difficulty Mr. Powell succeeded, "and we were presented with a beautiful glittering column, with lines of division across it, in number and distance seemingly corresponding with the serrations that we had observed in the other fibre, which had been viewed as a transparent object. It was not at once that the eye could adapt itself to the brilliancy of the object, but by degrees these divisions developed themselves, and could be accurately traced. They are not so marked as the inverted cones which bat's wool presented, but they were distinct enough, and the apex of the superior one, yet comparatively little diminished in bulk, was received into the excavated base of the one immediately beneath, while the edge of this base, formed into a cup-like shape, projected, and had a

serrated or indented edge, bearing no indistinct resemblance to the ancient crown." All these projecting edges pointed in a direction from the point to the apex.

The true cause, then, of the felting property of wool, and at the same time its distinguishing character when contrasted with hair, consists, as the microscope demonstrates, in its external serrated structure. When viewed through a microscope of great power as a transparent object, the fibre of wool assumes a ribbon-like appearance, with the edges serrated; but these serrations, when the fibre is viewed as an opaque object, are found to result from the presence of a succession of inverted cones, encircling a central stem, the apex of the superior cone being received into the cup-like base of the inferior one; each cup-like cone has projecting and indented edges, and is further resolvable into distinct scales or leaves, set regularly around the central stem, like the scaly petals of some flowers. These scales vary in number, size, and degree of projection, in the wool of different animals. In some instances these scales are pointed, in others rounded. In the wool of the bat these circlets are so decided as to produce the appearance of a series of cups placed one in another, and having indented edges. Though hair is covered with scales or rugosities, it has no serrations or tooth-like projections. The hair of the tiger, for example, is covered with fine scales like those on the back of a sole, while the wool, which is beautifully fine, being only the thousandth part of an inch in diameter, has numerous and distinct serrations, amounting to 2560 in the space of an inch. In the wool of the bear, and of the Italian wolf-dog, the serrations are distinct and numerous. The human hair, as ascertained by Mr. Gill, is of a cylindrical form, and covered with scales or rugosities, but without serrations. Dr. Goring, indeed (see *Brande's Quarterly Journal*, 1826, p. 433), describes the appearance of the hair of the human head as being indented with teeth, somewhat resembling those of a coarse round rasp, but extremely irregular and rugged; he states that these all incline in one direction, like those of a file, viz. from the origin of the hair towards its extremity. "It is singular," says Mr. Youatt, "that although many years have passed, and the microscope has been singularly improved since Dr. Goring observed this structure of the hair, and almost every one who possessed an instrument of much power has been eager to gaze on this new discovery, no person has been so fortunate as to detect a single serration on its edge." A true serrated surface, according to Mr. Youatt, is the character of wool only. The wool of the rabbit is fine, with sharp angular serrations to the number of 2880 in the inch, being 160 more than in the highly valuable and felting Saxon wool. The fibre,

however, has fewer curls. The hair of the rabbit varies from 1-250th to 1-300th part of an inch in diameter, and is covered with a scaly incrustation, but cannot be said to be serrated.

In the seal the wool is abundant beneath the compact hairs, and is exceedingly fine, but the serrations are few and far apart; the hair, having about nine times the diameter of the wool, is beautifully covered with close scales, but there is not the vestige of a serration. In the wool of the bear the serrations are found to present a curious character; they resemble many spines projecting at irregular distances, and at an exceedingly acute angle. The serrations in the wool of the Italian wolf-dog are superficial and irregularly placed, some resembling small spines, others looking like rounded prominences. When this wool is viewed as an opaque object, each cup appears to be composed of two, and sometimes three leaves or scales.

In fine, the differences between hair and wool, according to Mr. Youatt, may be summed up as follows:—The fibre of wool is crisped or curled, the curls increasing with the fineness and felting property of the wool, and in addition to this its surface is decidedly serrated. On the contrary, hair, though sometimes curled, has its surface only scaly or rugose, and never truly serrated; and hence it is that hair, though it will entangle and harle, will not felt into a compact mass. As respects chemical composition hair and wool are alike.

We have already said that in a fibre of Merino wool 2400 serrations may be counted in the space of an inch. In a fibre of Saxon wool, finer than the Merino, and of acknowledged superior felting quality, 2720 serrations have been counted in the inch. A fibre of Southdown wool, the felting powers of which are inferior to those both of the Merino and Saxony, was found to present only 2080 serrations in the space of an inch; and a fibre of Leicester wool, which is inferior in its felting property to the Southdown, presented only 1860 serrations in the space of an inch.

It is, then, on these serrations, combined with its spirally curling form, every fibre being twisted into numerous cork-screw-like gyrations, its softness, and its elasticity (or disposition to submit to some elongation, or under other circumstances to contract), that wool owes its powers of felting; that is, of forming an unwoven, but compact, strong, and perfect tissue—a tissue, if we may so term it, known in the earliest ages, and of which, as we have previously stated, we have seen an Egyptian, or perhaps Græco-Egyptian, specimen, covering a mummy obtained at Thebes. The process of felting is simple; a felted substance is the groundwork of beaver hats, and the mode in which this is produced may be seen at any hat manufactory.

Without entering into minute details, we may observe that the foundation of a good hat is made generally of about eight parts rabbit's fur, three parts Saxony wool, and one part llama or vicugna wool, termed red wool. The whole of this is first bowed. The bow is an ashen staff six or seven feet in length, having a strong cord of catgut stretched over bridges at two ends. The bow is suspended by a string attached to its middle, and fastened to the ceiling, so as to hang nearly on a level with the work-bench, the materials being laid on the bench, first separately, and then mixed together, the bower grasping the staff of the bow with his left hand, and plucking the cord with his right by means of a piece of wood, thus causes the string to vibrate rapidly against the wool and fur. This process being continued for a certain time, all the original clots, or assemblages of filaments, are perfectly opened and dilated, and the fibres flying upwards when struck, are, by the dexterity of the workman, made to fall in nearly equable thickness on the bench, presenting a very light and soft layer of material. Simple as this operation may appear, it requires long practice for the attainment of proficiency in it. The next stage consists in dividing the bowed materials into two triangular portions, and subjecting each to pressure, first with a wicker frame, and afterwards by the hands, the layer being covered with leather or oilskin; the fibres by this operation begin to felt, they are brought into closer and closer contact, the serrations link together, the fibres intertwine, and a coherent fabric is formed. In like way two edges of each piece or *batt* are afterwards locked together, the surface of one batt being kept from coming in contact with that of the other, by means of a piece of paper. Thus a conical hollow cap is formed, ready for a still more perfect degree of felting. It is now taken to the hatter's *kettle*. Imagine a large kettle, open at the top, having a fire beneath it, and eight planks ascending obliquely from the margin, so as to form a sort of octagonal work-bench, five or six feet in diameter, at which eight men may work; the planks are made of lead near the kettle, and of mahogany at the outer part, and at each part a workman operates on a conical cap, until the process of felting or planking is completed. The kettle or cauldron contains hot water, slightly acidulated with sulphuric acid, in which the cap is dipped from time to time, and after each dipping laid on the felting plank and rolled and unrolled, worked, twisted, pressed, and rubbed with a piece of leather or wood tied to the workman's hand; it is also rolled from time to time with a rolling-pin, dipped again, and again worked and rolled; considerable skill is required in making the felt of equal thickness, or of regulating the thickness where additional substance is requisite. When this felting process has been continued for about

two hours, it is found that the heat, moisture, pressure, and manipulation, have reduced the cap to one-half of its former dimensions, its thickness being increased in a proportionate degree. It is now fairly felted, and assumes the appearance of a close, stout, tough, fabric, ready to undergo farther processes; into which, however, as our object is merely to explain the process of felting, we shall not enter.

We have here described a pure felt; but the process of felting is carried into operation even in woven fabrics, as, for example, in broad-cloth, of which the best is made of fine Saxony wool. This cloth when fresh from the loom, besides being replete with oil requisite for the manufacture of the raw material, is very open, with the threads apparent, and would neither wear well nor look well; it is sent to the fulling mill, there it is first purified in troughs of water mixed with argillaceous earth from all the oil with which it is imbued; it is passed through rollers, and washed thoroughly, and this being done, it is properly soaped and put into the fulling mill; in this mill, by the conjoint influence of moisture and pressure, the open tissue closes, the threads are brought close together, they cohere, a felting process has taken place, and the result is a woven fabric, the fibres of which are felted together. The cloth has, however, greatly contracted; it is thicker, closer, and softer than it was previously, and when cut in any direction shows no disposition to unravel. Even when, by wearing, cloth becomes thin and thread-bare, it will not unravel, though the slightest pull suffices to tear it. No one is ignorant of the fact that new flannel of every description shrinks or contracts greatly when first washed, and more or less on each subsequent occasion; the washing in hot water produces a partial felting, the threads and fibres are brought closer together and more firmly interlocked, and the fabric is thickened.*

The fibre of wool varies not only in the number and acuteness of its serrations but in several other important particulars, depending upon breed, food, temperature, and health. Wool, like hair, grows from a secreting vascular bulb or root seated below the cutis; from this bulb it is gradually evolved; each filament passes through a canal of reflected integument, and emerging from the surface of the skin continues to grow till it has acquired its full development. As each filament of wool, at least

in the sheep, pushes itself through the pore of the skin, it becomes smeared with a saponaceous secretion which, from its adhesiveness and colour is called the *yolk*. This yolk is a peculiar secretion of the skin; it is not mere inspissated perspiration, and it is evidently intended to nourish the wool and to mat it together without felting, in order that the whole fleece may form a compact and warm covering. The secretion of this *yolk* varies as to abundance in different breeds; it is profuse in the Merino sheep and in most other fine-woolled breeds, but in districts where the cold is severe it is more or less deficient. Certain parts of sheep are more freely supplied with this secretion than others; it is most abundant on the breast and shoulders. It has been observed that where there is a deficiency of this secretion that the fibre of the wool is dry and harsh, and that the fleece becomes thin and hairy, while, on the contrary, where it is in natural quantity the fleece is soft, full, strong, and oily. Where it is deficient a remedy is sought by smearing the sheep with a mixture of tar and oil. Mr. Luccock states that the shepherd in the north finds this dirty coat of salve "as indispensably necessary to the good qualities of the fleece, as it is to the health of the animal; without it, the wool becomes hairy, thin, and light; with it, the fleece is full, soft, and rich, possesses a sufficient quantity of healthy yolk, and the qualities and condition of the wool are wonderfully improved. From these circumstances we conclude that the yolk is not only necessary to the production of a valuable fleece, but is the very pabulum of wool. The manner in which the yolk acts upon the wool is not accurately known. Some have considered it as a superabundance of that substance which forms the filament, and which, by some unknown process, while the pile is growing, is consolidated into a transparent mass; while others conclude, perhaps more reasonably, that it is a peculiar secretion that exudes through the skin, and by intermingling with the pile renders it soft, pliable, and healthy, affecting it much in the same way as oil does a thong of leather, when kept immersed in it, and perfectly saturated. In general this substance has been noticed without any reference to the breed of the animal, or the qualities of the fleece which it bears, sometimes as perfectly disregarded as the sand and hay-seed which are accidentally mingled with the pile; yet the disposition to produce this valuable soap is certainly as important as some other characteristics of the sheep, and ought not to be overlooked when we describe their different varieties, or select them for our farms."—*Luccock on Wool*.

The yolk, as it is termed, being saponaceous, is easily removed by washing in water. It consists of an animal oil with potass and lime, and in unwashed fleeces has been found to constitute

* It may be asked why wool does not felt when on the back of the sheep? Under certain circumstances it will do so; but as the fibres in their natural state are all directed parallel to each other from the skin, and as the serrations of each fibre are directed from the base to the extremity of the fibre, the fibres lie in close contact together without the serrations becoming interlocked; for wool will not felt unless the fibres are reversed relatively to each other; the points of the serrations cannot catch hold of each other, they do not oppose each other. But let a portion of wool be divided, and its filament scattered loosely into every possible direction, as by the bow of the hatter, and then be pressed and worked, the felting begins immediately.

about half the weight of the whole; this is the usual allowance of weight to the wool buyer on fleeces which are sold without having been washed. After washing, the fleece still retains a portion of oil or fatty matter, which was not in combination with the alkali. The purest fleece greases the hands when felt and examined by the touch.

From this secretion termed the yolk, let us turn to the fibre of the wool, or the *staple* as it is termed, and consider the characters which it ought to exhibit, irrespective of its serrations, which, as may be expected, are the fewest in long wools, which are not well adapted for felting.

Filaments of wool taken from a healthy sheep, when cleaned from impurities, present a beautifully polished and glittering appearance. When viewed by the aid of a powerful achromatic microscope the fibre is often even brilliant, especially along its centre. The section of the fibre is circular, and the fibre is generally larger at the extremity and at the root than in other parts. There is a remarkable semi-transparency in the fibre of sound healthy wool in general, in strong contrast with the opacity of the hairs, or *kemps*, which occasionally lessen the value of the fleeces of sheep of good breed, improperly treated.

In neglected, half-starved, and diseased sheep, the wool assumes a different appearance; the filaments are no longer brilliant and semi-transparent, but are pale, dull, more or less opaque, and dry or withered; such wool is valueless. It sometimes happens that *breaches* occur in the filaments; that is, dry, contracted, dull portions, of a longer or shorter extent, between two portions of sound, brilliant, and properly serrated filament. This *breach* is evidently the result of a failure in the health and vigour of the sheep, at the time in which the portion of wool in question was in the act of growth. Mismanagement, injudicious change of pasturage, and various other causes, may have affected the sheep in the first instance, and so led to the deterioration of its fleece. *Breathy* wool snaps under the operation of the carding comb, and even should it not, it renders the tissue or fabric into the manufacture of which it enters, of very inferior quality. A practised wool-stapler will detect *breathy* wool immediately, even without the aid of the microscope.

With respect to the wool of the llama, vicugna, and alpaca, the filaments are far more opaque than are those of the fleece of sheep; they are, in fact, of a different character, and have a smooth and silky texture.

Fineness of filament is one of the qualities on which the value of wool greatly depends; the fineness of wool varies in different breeds of sheep, and is much influenced by soil and climate. In hot countries, the wool, often greatly mixed with hair, is coarse; while in cold countries the fleece

is finer, closer, and warmer, and well calculated to defend the animal against the inclemencies of winter. If, however, the sheep of a cold climate be stinted in their food as the winter comes on, the wool, though fine, will be deficient in weight, strength, and usefulness. On the contrary, if the sheep be well kept, the wool will not only be fine, but sound, bright, and strong; the fleeces will weigh well, they will remunerate the sheep-farmer, and do him credit. Wool may be considered as coarse when the diameter of the filament exceeds the five hundredth part of an inch; it is fine when within this admeasurement; and very fine when not exceeding the nine hundredth part of an inch in diameter, as in picked specimens of the best Saxony wool. The quality of pasturage influences the quality and fineness of the wool; this is a fact which has been long known. "*Fuge pabula læta*," avoid rich pastures, says Virgil, if you breed sheep for their wool. The best breed of sheep, if enclosed in rank deep pastures, or if fed on artificial food and thus fattened rapidly and highly, will exhibit a deterioration of the fineness of the wool; if, on the contrary, sheep be starved, the wool is dry, weak, and destitute of brilliancy: it is, in fact, a *breach* from root to apex. The finest-woolled sheep will maintain themselves in tolerable condition where the coarse-woolled breeds would starve, and, when put into better pasturage, will fatten far more quickly and kindly than the latter; but rich pasturage and fine wool are not the concomitants of each other. In the establishment of the new Leicesters, for example, the wool was sacrificed to the carcase; this was acknowledged by all; indeed, Mr. Bakewell was of opinion that weight of carcase was of the first consideration, and that the fleece was of secondary importance, and upon this principle he proceeded, neglecting the wool and aiming at the establishment of a breed, in which a disposition to fatten, and a production of the greatest portion of meat, with the smallest quantity of bone and offal, should be the chief characteristics.

We must not suppose that the wool on every part of a sheep is alike in fineness; it differs considerably. That on the side of the neck, or the shoulders, back, and ribs, is the finest; that on the thighs and haunch is coarser; on the neck, breast, and under parts generally it is still more so. A single sheep, as will be at once perceived, bears wool adapted for different purposes, and the assortment of the fleece into different portions, is one part of the business of a wool-stapler. In this work practice make the eye and hand perfect, and the division into parcels, according to the fineness of the staple, is quickly effected, and that without hesitation or mistake; as the locks are sorted, they are thrown into baskets from six to ten or twelve in number. The fleeces of short-

woolled sheep are usually divided into ten lots, of varying degrees of quality, from the first to the last, viz. the *picklock* or picked locks, the *prime*, the *choice*, the *super*, the *head* or wool of the head, the *downrights*, the *seconds* from the throat and breast, the *abb*, the *livery*, and the *short coarse wool* the refuse of all. The first, or *picklock*, is small in quantity, and cannot be obtained from inferior fleeces. The greater part of a good South-down fleece would go into the *prime*, *choice*, and *super* parcels. The other qualities of wool are soundness and trueness of staple, softness, and elasticity.

By *trueness* of staple, is meant a wool as equal in the fineness of its filaments on every part of the body as possible, a freedom from irregularities in the fibre, from knots, breaches, and also from an admixture of long hairs.

By *soundness* of staple is meant a due degree of strength, more especially of importance in the long combing-wools; for if in the act of combing the fibres be broken, they are useless. In sickly sheep the filaments are often very tender, and in old ewes, after the age of six, the filaments of wool being sparingly lubricated with the yolk, are often dry, brittle, and inelastic; it shrivels when washed, is difficult to spin, and deteriorates the quality of the fabric in which it is employed. Wool that clots or felts on the back of sheep which are neglected or half starved, may be regarded as unsound; this felting generally commences in the winter season, and after the fleece has been saturated with rain, and, unless the masses of felt fall off and separate from the wool beneath, the process goes on increasing until shearing time. To unravel these masses of felt is almost impossible, and the wool moreover is poor.

With soundness, *softness* must be associated. Softness is partly dependent on fineness of fibre, but perhaps more so on a full supply of yolk; this natural unguent defends the fibres from the action of the air and sun, and from dust: where it appears to be deficient, a thorough salving with an ointment of tar and butter has been found very efficacious, and the northern breeders commonly have recourse to it. It perhaps excites a secretion of the yolk, or, what we think more probable, acts as a substitute for it. It certainly renders the wool rich and pliable, as the experience of the best farmers has satisfactorily proved, and its application is strongly recommended by Mr. Bakewell, who asserts that investigation and trials have confirmed the benefits resulting from its application.

It has been observed that the wool of sheep fed upon chalky ground is apt to be harsh and destitute of pliability. The dust of the chalk fills the fleece and acts as a drier; it causes the fibre to shrivel, it unites with the yolk, renders it ineffi-

cacious, and forms an inert substance which the first heavy shower washes away. Thus the fleece is deprived of its natural pabulum and unguent; it becomes dry, loses its softness, and is thereby rendered of inferior value. This deterioration of the wool also occurs in sheep fed on tracts of limestone. Mr. Bakewell observes, that in certain parts of Derbyshire the change from a limestone surface to one of silicious grit or sandstone is often very abrupt, so that two adjoining farms, separated by a brook, may be situated, one on a stratum of the former, the other on a stratum of the latter; and he adds, that the difference of the wool from two flocks of sheep of the same breed, fed respectively on the two farms, especially as it regards softness, is most distinctly marked, insomuch that the farmer would ask and obtain 1s. or 1s. 6d. per pound more for the wool grown on the grit than for that grown on the limestone. With the pliability of wool should be conjoined *elasticity*. The two properties should balance each other. A filament of wool will be found to consist of a series of gyrations or minute spiral curves. When extended and brought straight, it will, when freed, return to its original condition; it is to the just union of fineness, softness, and flexibility, that the beauty, pliancy, and delicacy of the finer woollen stuffs are owing. We may crumple them and twist them, but they show no creases; the fabric, exquisitely delicate as it is, recovers itself. Such fabric always falls into beautiful and permanent folds.

By the application of heat, and the operation of different modes of dressing, new and peculiar twists or curls may be given to the fibres of wool; the innate elasticity of the substance of the fibres thus treated, enables them to retain the new form into which, if we may so speak, they have been tortured. The fanciful twisted, curled, or knotted naps, raised upon various cloths, maintain their character in consequence of the elasticity of the fibre of the wool. If a knitted worsted stocking be unravelled, the yarn shows by its zigzag form the use to which it has been applied; it is elastic: if drawn straight and elongated for an instant, it reassumes its zigzags and contracts, and will maintain this condition with the utmost pertinacity. Elasticity is, in fact, one of the most valuable properties of wool; it stamps a peculiar character upon all fabrics composed of this material, and is besides essential to the due working of wool into a pure felt, or of cloth into semi-felted condition. In speaking of the form of the fibres of wool, we observed that the basal portion of each fibre, and its apical portion generally, exceed in size the intermediate portion. This, we think, may be readily explained. We are alluding to sheep which have been previously shorn; the shearing leaves the end of each fibre abrupt, truncate, and close to the skin. This operation takes place in

warm weather; there is increased vascular action in the skin; it renews the secretion of wool vigorously; the material is abundant; hence a large filament begins to shoot forth; by-and-bye the secreting bulb becomes less active; winter approaches, and, as the cold comes on, the filament becomes more attenuated as it grows, for the pores of the skin contract; but when spring returns, the energy of the secreting bulb is renewed, the pores of the skin open, and the growing filaments acquire an increase of thickness; hence the basal and apical portions of each filament, the produce of the warmer months, exceed the intermediate portion, the produce of autumn and winter. In warm climates the filaments of the wool of the sheep are thicker than in our colder latitudes; the interstices between them are wider, and they do not combine to form so close and warm a covering as does a fleece composed of delicate filaments. This diminution of bulk in the fibre increases the value of the fleece, while it tends to the comfort of the animal; of course we suppose that the cold is not accompanied by starvation, for if this be the case, the fibre, delicately fine as it may be, will prove worthless, being weak, dull, and dry—in fact one long *breach* from base to apex. In this point of view the fleece of the sheep may be regarded as a sort of self-registering thermometer; the filaments indicating, here by their comparative thickness, there by their tenuity, the variations of atmospheric temperature which have occurred during their growth. In the Merino sheep of our island the filaments of wool, as they first shoot up after shearing, have been observed to be peculiarly strong and coarse, giving little promise of the fineness and softness of the fibre produced as winter advances. From this circumstance we may naturally infer that the plan of pasturing sheep in cool and shaded situations, during the heat of summer, tends to the benefit of the wool. It was the custom of the ancients, as we have seen, to lead their flocks, during the midday fervour, beneath shady rocks and spreading trees—spots which the

animals, if left to themselves, will naturally seek. Who has not seen a flock of sheep taking their meridian siesta on a hot day of June, July, or August, beneath the broad screen of some clump of trees, or of some lordly oak, or luxuriant beech!

With respect to the wool of the lamb, we may observe that its filaments are not truncate at the apex, but pointed; this slender point, however, becomes gradually thickened, and the rest of the filament as it grows is influenced, as we have described, by the temperature of the season. This pointed character is seen in the fibres of the wool of the lamb, whether shorn during the first summer, or left till the second. In the latter case it is called Hogget wool.

The classification and peculiar properties of the different kinds of wool, under the terms *long*, *middle*, and *short*, we shall hereafter consider when we treat of the breeds of sheep which each sort respectively characterizes. Our aim at present is to illustrate the early connection of the sheep as a domestic animal with the human race,—to show the value in which it has been held by primitive people whose dwellings were rude tents, and by the civilized communities of towns and cities, both of ancient and modern times,—to explain the reasons why this value has been and ever will be placed upon it, whether we regard it as a flesh-bearing or a wool-bearing animal; and to give a few details relative to the fleece for which it has so long been celebrated. The riches of the ancient world, when man began to multiply over the face of the earth, were flocks and herds; in process of time silver and gold became their representatives. The word *pecunia*, money, or personal property generally, is derived from *pecus*, a flock; and he was, anciently, the richest man whose possessions in flocks and herds were the most extensive.

We cannot then be surprised, that the rearing of cattle, and the culture of flocks, have engaged alike the attention of the statesman, the philosopher, and the practical man; nor that poets should have sung of herds, and flocks, and tillage.

CHAPTER II.

NATURAL HISTORY OF THE SHEEP.

FROM the preliminary observations—not, we trust, altogether uninteresting, of the preceding chapter, we shall now pass on to a consideration of the natural history of the sheep, glancing at that of the goat, its ancient companion in captivity and subjection to man; its companion as a milk-giving animal, as affording wool for the weaver, and flesh for the entertainment of guests.*

* The flesh of the kid was esteemed a delicacy, as was that of the lamb also; allusions to both animals are common in the Scriptures. In the early ages, however, the flock was not dimi-

Domestication has modified every animal which man has permanently reclaimed; but the extent of this modification differs in almost every species. In the camel perhaps, the least trace of modification exists: this animal is still the same as what it was when Jacob, with his flocks and herds, his asses and camels (both milch camels, and camels of nished by the slaughter of the kids or lambs, except upon special occasions; when Isaac asked for vension, or the flesh of the young gazelle, Jacob substituted that of kid, which was prepared as a savoury dish.

burden) met Esau; and we may therefore conjecture that the wild stock, now unknown, resembled its servile descendants. On the contrary, no species appears to have been so much modified as the dog, and yet there is no domestic animal of which so little is said in the ancient records. Both the sheep and the goat have been greatly modified, especially the former. In the earliest times, as we have said, they were wool-bearers; and though such no doubt were the wild stocks whence they descended, it was doubtless only in a partial degree, the under coat of wool being overlaid with stiff coarse hair, and more redundant in winter than in summer. Both the sheep and the goat are ruminating animals, with bifid hoofs, and a complicated stomach resembling that of the ox, which has already been sufficiently described. (See 'THE OX'.) They are the representatives respectively of two genera, *ovis* and *capra*, closely resembling each other, in most essentials, but nevertheless possessing their respective distinguishing characters. Cuvier says that the goats

(*capra*) have their horns directed upwards and backwards; their chin is generally furnished with a long beard, and the chaffron is almost always concave. The sheep (*ovis*) have the horns directed backwards, and then sweeping more or less forwards with a spiral twist. The chaffron is generally convex, and they are destitute of a beard. "So little, however, do they deserve to be generically separated from the goats, that they even produce together a mixed fertile race." Whether this hybrid race is really fertile *inter se*, or fertile only when crossed with one of the pure breeds, is doubtful. But granting the former, we cannot allow that the sheep and goat are specifically identical, nor even that the two genera, *ovis* and *capra*, should be fused into one.

In a paper on some of the wild sheep and wild goats of the Nepal range by Mr. Hodgson, published in the Proceedings of the Zoological Society, London, 1834, he gives the following table of differential characters between the genera *ovis* and *capra*, as the result of his own investigation.

GOAT, OR CAPRA.	SHEEP, OR OVIS.
Whole structure stronger and more compact	Less so.
Limbs thicker and more rigid	Feebler and more slender.
Hoofs higher and more compact	Lower and less so.
False (or lateral rudimentary) hoofs well developed	Evanescent.
Head smaller and finer	Larger and heavier.
Facial line straight	Chaffron arched.
Ears shorter and rounded	Longer and pointed.
Tail short, flat, nude below	Longer, less depressed, and half nude only.
Withers higher than croup	Croup higher.
Fore legs stronger than hind	Fore and hind equal.
Croup sloped off	Croup higher.
Odorous	Not so.
Nose moister, <i>nares</i> short and wide	Less moist, longer and narrower.
Horns of medial size, keeled, and turned upwards	Horns very large, not keeled, and turned to the sides.
Eyes darker and keener	Paler and duller.
Hair long and unequal	Short and equal.
Back arched	Back straight.
Bears change of climate well	Bears it ill.
Is eminently curious, capricious, and confident	Is incurious, staid, and timid.
Barks trees with its horns, feeding on the peel, and on aromatic herbs	Does not bark trees, and is less addicted to aromatics.
In fighting rears itself on its hind legs, and lets the weight of its body fall on the adversary	In fighting runs a-tilt, adding the force of impulse to that of weight.

"The goat and sheep," he adds, "have in common hair and wool, no beard, no suborbital sinuses, evanescent muzzle, no inguinal pores, horns in contact at the top of the head, knees and *sternum* (breast) callous, angular and transversely wrinkled horns, striated ears, two teats only in the female, horns in both sexes, and lastly, incisors of precisely the same form.

"Of the various diagnostics, then, proposed by Colonel Hamilton Smith, it would seem that the following only can be relied on to separate *ovis* from *capra*:—slender limbs, longer pointed ears, chaffron arched, *nares* long and oblique, very voluminous horns, laterally twined with double flexures. I should add myself the strong and invariable distinction, males not odorous, as opposed

to the males odorous of the genus *capra*. But after all there are no physical distinctions at all equivalent to the moral ones, so finely and truly delineated by Buffon, and which, notwithstanding what Colonel H. Smith urges in favour of the courage and activity of *sheep*, will for ever continue to be recognised as the only essential diagnostics of the two genera."

With regard to these moral distinctions, though we admit them, as far as the domestic goat and domestic sheep of Europe, and perhaps of all countries, are concerned, the observation does not apply to the wild species of either genus, they are alike suspicious, wary, and watchful; but when pushed to an extremity will turn with desperate resolution upon their antagonist, and endeavour

to hurl him down the rock or precipice. We have known specimens of the Corsican mouflon very savage and uncontrollable in captivity, and ever ready to make a sudden assault. And be it observed, that when our domestic sheep is placed under circumstances which render it in some measure dependent upon itself, as when depastured upon vast moorlands or mountain ranges, though it becomes very wild yet it displays qualities which might not have been anticipated: the rams, in particular, often exhibit a surprising degree of boldness, and will assault a strange dog, or a fox which may have the temerity to attack the flock; they form themselves into a phalanx and run a-tilt upon their enemy, whose only chance of safety is in flight. We admit that our domestic goat is curious, and familiar; it will play in mimic combat with men or dogs, to whom it is accustomed; it is lively and animated, bold and intrusive, sometimes even extremely dangerous;—but then, unlike the sheep, in our island at least, it is brought up as the companion of men, horses, and dogs, and thus learns confidence. Were the sheep thus educated, it would, to a certain degree at least, exhibit the same qualities though with less obtrusiveness.

With respect to the physical qualities of the sheep and goat, we consider the wild races of the former, termed mouflons and argalis, quite equal in stature and bodily powers to the largest wild goat or ibex. Indeed, we know not any species of ibex which at all approaches in size and power to the huge Siberian argali (of which a magnificent specimen adorns the British Museum), or the Rocky Mountain sheep of North America.

Mr. Hodgson's table of comparisons between the sheep and the goat, appears, we think, to be drawn too exclusively from the peculiar characteristics of the domesticated races; and the same observation applies even more forcibly to Buffon's remarks on their moral distinctions.

Again, Mr. Hodgson says, relative both to the sheep and goat, "no beard, no suborbital sinuses." Now with regard to the beard, always wanting in the sheep, it is more or less distinct in every species of true ibex which we have had the opportunity of examining: but he is evidently influenced in this observation by the characters of the *jhâral* of the Nepâl range of hills, which he considers to be a wild goat. "This," he says, "is truly a goat, and is a variety of *Capra Ægagrus*, agreeing in its horns with the Alpine race; its head is closely shorn on all parts, and there is *no vestige of a beard*; there is, however, a copious flowing leonine mane covering the whole neck and shoulders."—*Trans. Zool. Soc.; Lond.* 1833, p. 105. This animal, he afterwards observes, must not be confounded with the *ghôrâl* (a capriform animal inhabiting the same range), the latter being truly an antelope: its horns are cylindrical, while those of the *jhâral* are

angular; the latter is at first sight distinguished by a large flowing mane, of which there is no vestige in the ghoral. (*Antelope, Goral.*—*Hardwicke.*)*

But the *jhâral* is not a true ibex or wild goat. It has a small naked muzzle, and there are *four* teats in the female; there being only *two* in the sheep and goat. Mr. Ogilby places the *jhâral*, or as he terms it, *iharal*, and an allied species from the Neilgherry hills, in the genus *kemas*.—*Proceeds. Zool. Soc.; Lond.* 1837, p. 81.

As respects the absence of suborbital sinuses, both in the sheep and in the goat, Mr. Hodgson is in error. These sinuses are indeed wanting in the goat; but, as we believe Mr. Ogilby first pointed out, they are present in the sheep, and what is more they are large and deep; the external orifice however is a mere slit, and unless specially sought for is not to be seen amidst the woolly fur or dense hair with which the face of the sheep or of the wild mouflon is invested. The sinus, however, is incapable of being expanded and closed at will, contrary to what we find it in the common antelope.

There is, besides, another difference between the goats and the sheep; the latter have interdigital pits which are wanting in the former. These pits, A, secrete an unctuous matter, the use of which is not very clear. They are present in many antelopes, but wanting in the ox tribe.

In the sheep, then, but not in the goats, there are interdigital pits, but neither have inguinal pores; in both, the muzzle is small and hairy, with the upper lip divided, and the dentition similar. Incisors $\frac{0-0}{2-0}$, canines $\frac{0-0}{2-0}$, molars $\frac{6-6}{2-2}$. Total, 32. Teats, two.

In both the horns are persistent, and sheath a bony core, which is hollow, and communicates with extensive frontal sinuses. We may here say that though the chaffron of the sheep is characterized as being convex and that of the goat flat, we have seen the chaffron in some goats very convex, with extensive frontal sinuses, separating to a great extent the two tables of the frontal bones. In our climate the goat is covered chiefly with hair and the sheep with wool, but in intertropical regions the sheep loses its fleece, and becomes covered with hair; while in certain cold localities, as among



* An allied species, the *thar* (*antelope thar*) nearly allied to the Cambin-ontan of Sumatra (*antelope sumatrensis*.—Desmarest) inhabits also the Nepâl range.—See *Proceeds. Zool. Soc.*, 1839, p. 85.

the mountains of Thibet, the goat is defended by an under-coat of the finest wool. Both the sheep and the goat are gregarious, and are formed for elevated and rocky situations. The distinctive characters of the genus *Ovis* may be summed up as follows:—Horns massive, especially thick at the base, angular, more or less spirally twisted, with the points generally advancing forwards. No beard; suborbital sinuses opening by means of a slit, and incapable of being expanded and closed alternately; interdigital pits.

Confining our attention for the present to the domestic sheep, which, now spread over the globe, presents us with innumerable varieties, some of strange aspect, the first question that suggests itself relates to its primitive source or origin. Are we acquainted with the wild stock from which it has descended? The opinion of many writers is that the wild mouflon or musimon of the rocky precipices of Sardinia and Corsica, is undoubtedly the species whence it has descended. This is the opinion of Mr. Bell, who states that the sheep is one of our domestic animals which may be traced with tolerable certainty to a species still existing in a state of nature, and sufficiently accessible to afford opportunities of comparison and even of experiment. This species he believes to be the Corsican or Sardinian mouflon, the characters of which, he remarks, are such as to afford the most reasonable probability of the correctness of the opinion.

Mr. Bennett advocates a modification of this theory; he observes, that the mouflon of Corsica is the parent stock from which were derived most of the European breeds, as has been proved almost to a demonstration, and that the origin of the Asiatic races, as numerous as the European, from the Siberian argali is equally certain. Now, the Corsican mouflon and the Siberian argali are two very distinct species—the latter being an animal of vast stature and robustness; consequently, granting the views of Mr. Bennett to be correct, seeing that the sheep of Asia and of Europe intermix, the union of two separate species may produce offspring fertile *inter se*. While, however, we allow that the offspring of allied species will be productive *inter se*, we cannot, in this instance, admit the correctness of Mr. Bennett's ideas relative to the origin of the sheep of Europe and of Asia; indeed, we think the tracing of the domestic sheep to its original source, so far from having been done with certainty, is a point upon which we are utterly at fault. Thousands of years have passed since the sheep was first reclaimed; it has spread as a domestic animal throughout every quarter of the globe, and climate, food, and general cultivation have contributed to modify it, not only as regards horns and clothing, but stature and proportions. As, however, many authors have expressed themselves confidently on the subject, and

as the history of the various species of wild sheep, not yet thoroughly discriminated from each other, is both interesting and important, we shall attempt a brief monograph of the genus *Ovis*, which, we trust, will not be unacceptable.

There is no part of the globe, if we except Australia and South America,* which has not an indigenous species of wild sheep. Perhaps we should except Africa, for no true wild sheep inhabits that extensive continent, as far at least as we are aware. There is, however, in the mountains of Barbary, and Northern Africa in general, a species which most naturalists have associated with the true sheep, under the head of *Ovis*, and which is known as the *aoudad* of the Moors, the *kebsch* of the modern Arabians, and the *tedal* of the inhabitants of Nubia. This is the *Ovis Tragelaphus* of Pallas. It is not a true sheep, it is a



THE AOUDAD.

sheep-goat, and stands intermediate between the genera *ovis* and *capra*. The horns are those of a wild sheep, being triangular and ringed, stout and massive, with a disposition to the spiral curve; in other respects it is far from resembling any wild sheep. It has interdigital pits, but no suborbital pits or sinuses; its chaffron is concave, and the hair of the body is rather close. On the other hand it has no beard, but is remarkable for the quantity of long pendant hair, falling from the throat and under part of the neck, and from the chest and upper part of the fore-limbs. This hair is from nine inches to a foot in length in the male, falling almost to the ground; there is besides a mane along the back of the neck and on the withers, full and dense, and about three inches in depth; the tail is rather long and tufted at the extremity, the general colour of the animal is dull yellowish brown. The male aoudad is a noble animal, considerably exceeding the female in stature, and often three feet in height at the shoulders; it appears, however, to vary in size, and the

* At least no well-authenticated species have been received from South America.

Ovis Ornata, figured by M. Geoffroy St. Hilaire, in the great French work on Egypt, appears to be merely a small-sized individual. The aoudad is found in North Africa, generally above 18°; it roams the mountains of Sinai, and those which border the Nile, to Ethiopia and Abyssinia, and is often represented very faithfully on the sculptured remains of ancient Egypt. It frequents the most rocky deserts, associating in small families, making the mountain pinnacles and inaccessible crags its home. Its activity is wonderful, exceeding even that of the chamois, and the chase is a work of peril and toil. A few are sometimes shot by the Moors of Tunis, Tripoli, and other places along the northern coast of Africa, and the young are occasionally captured alive; it is regarded as venison, and its flesh is in great esteem. The female is horned as well as the male.

The aoudad forms the type of the genus *Am-*

motragus,* of Blyth, who, we think, has judiciously separated it both from the true sheep and the true goats. It is an animal which has been known from the earliest antiquity, and may be perhaps the akko, or wild goat, of Deuteronomy xiv. 5. Splendid specimens are preserved in the British Museum.

Setting this animal aside, it would seem that the range of the wild species of the genus *Ovis* extends along the mountain ranges of Southern Europe, and through those of Central Asia, passing northwardly to Kamtchatka, and thence through the Aleutian isles, to the northern and western portions of North America (the Rocky Mountains and California).

Confining our attention to the true wild sheep, or mouflons, we may first notice the mouflon of Corsica and Sardinia (*Ovis Musimon*, Linn.) This species, the Mouflon or Musmon, tenants the



MOUFLON OF CORSICA.

rocky fastnesses of the two islands mentioned, and appears to exist in some of the Greek islands, and the countries of the Levant generally. Pliny mentions this animal, which, he says, occurs in Spain, (it is said, but we know not how correctly, to linger still in the mountains of Murcia,) but especially in Corsica, and he states that it is covered with goat-like hair; and Strabo observes,

* Speaking of the genus *Ammotragus*, Mr. Blyth says, "It is characterized by the absence of suborbital sinuses like the *goats*, but differs from the latter in possessing interdigital *fossæ* as in other sheep. This difference between the *goats* and *sheep* appears to have been first noticed by Pallas, and has since been descanted upon by Professor Gené, in Vol. xxxvii. of the *Memorie della Reale Accademia della Scienze di Torino*. The fact of such a diversity in genera, so nearly allied in habitat as the *goats* and *sheep*, renders the problem of the utility of the structure in question somewhat difficult of solution. The species upon which I found the subgenus *Ammotragus*, has decidedly an ovine rather than a

that in Sardinia and Corsica are produced sheep called *musmones* or *musimones*, which, instead of wool, produce hair like that of a goat. Gesner likens the hair of the mouflon to that of a stag; the hair of the mouflon, however, is unlike that of the goat, and still less resembles that of the stag; it is crisp, harsh, and closer set, not pressed to the skin, but standing out, and admirably

caprine aspect when viewed alive. The male emits no stench as in the *goats*, the bleat is precisely like that of *ovis*, and the animal butts like a ram and not like a goat. Unlike the other admitted species of wild sheep, as well as the long-horned or true wild goats, it has a concave chaffron, and no markings on the limbs and face; its tail is rather long, which is the case in no species of *capra*, and is also remarkable for being tufted at the extremity. The indigenous habitat, North Africa, is a further peculiarity in the genus in which it is here placed, though two species of wild goat respectively inhabit Upper Egypt, and the snowy heights of Abyssinia."—*Proceeds. Zool. Soc.*, 1840, p. 75.

adapted for preserving the body from cold: underneath this coat there are very fine hairs, forming an additional vestment. Mr. Bell, who regards this species as the origin of the domestic sheep, after remarking that the covering of the mouflon differs considerably in its appearance from that of the domestic sheep, adds, "it is customary to account for the difference in the following manner: It is said by all the naturalists who have written on the subject, that the pelt of the mouflon consists of long hair, forming the apparent covering, and of a short soft wool beneath, which is only visible when the former is removed. It is therefore presumed that by domestication this interior is developed at the expense of the former, and becomes the woolly pelt of the domestic races. This, however, is totally erroneous. The longer hairs of the mouflon are, in their structure, as genuine wool as that of the sheep; they are coarse and stiff it is true, and nearly straight, but they possess the essential character of wool, in the imbricated scaly surface which gives to wool that remarkable felting property, upon which its peculiar utility in many cases depends. It is also somewhat waved, and it requires no considerable change to convert such a filament as this into fine curly wool. On the contrary, the short soft felt which lies at the root of this, is nothing more than extremely fine hair, uniform and smooth over its whole surface, and not assuming the slightest appearance of the woolly texture. I have examined these two kinds of hair of the mouflon, from various parts of the animal, and have found no essential variation."

If Mr. Bell be correct in his views respecting the character of the harsh pelt of the mouflon, we have here an example of an arrangement contrary to what prevails in other wild animals, as far at least as we know at present: in feline animals and in fur-bearing animals, as the beaver, the polecat, the ermine, the sable, the under coat is wool and the external covering hair; and the observation may be extended. Mr. Plint says that the fleece of the argali (mouflon) is thin in summer, but that in winter a fine wool fills up the interstices between the hairs, and protects the animal from the inclemency of the weather.

Mr. Youatt thus speaks of the covering of the mouflon:—An argali (mouflon,) died at the gardens of the Zoological Society a little while ago, and Mr. Youatt, being then confined by illness, requested a very intelligent and observant friend to examine the proportion of wool which grew among the hair. He reported that there was not a particle of wool. Mr. Youatt was surprised at this, as the mouflon is described as having a winter coat at least of fine woolly down; he therefore sent and requested a small portion of the pelt. The hair was long and coarse enough, but at its

base was an exceedingly small quantity of crisped wool. There was so little of it that it could scarcely be detected on the pelt, but was clearly seen when a lock of the hair was cut off close to the skin and held up to the light. This goes far to explain the accounts that have been given of perfectly hairy sheep. We may here observe, that the specimen of a smooth close-haired domestic sheep, from Guinea we believe, is preserved in the British Museum; its colour is a sandy red; the legs and chest are marked with blotches of white; there are no horns; the ears are pendant; the tail long; and two tassels of skin hang from the throat. There are other hairy varieties. Now, if we adopt Mr. Bell's opinion, we must regard the coarse rigid hair of the mouflon as wool, and the fine under coat as hair, and believe that it is from a modification of the former the sheep becomes a wool-bearer; this we cannot admit;—for, after all, will the external pelt of the mouflon felt? We think not; and moreover, we see no reason to believe that to this animal we are to look for the original stock of the domestic sheep.

The mouflon is bold, active, and powerful, occupying the most elevated mountain ridges, where it associates in considerable troops, which in winter descend for pasturage into the dells among the cliffs, or into a lower altitude. The troops are under the guidance of the old males; and in December and January subdivide themselves into small flocks, each consisting of females, headed by a single male. At this time the males, when they meet, fight with the greatest obstinacy, one being often killed on the spot, in which case the troop headed by the vanquished combatant joins that of the conqueror. The females go five months with young, and generally produce twins, which they defend from all attacks with the utmost courage. The female is less in stature than the male, and her horns are small and often wanting.

The adult male stands about two feet three inches at the back; the chaffron is convex; the horns are large, strongly marked with transverse rugæ, especially at their base; they sweep spirally round, so as to describe about two parts of a circle, but never more; the tail is very short, and naked below; it is bowed forwards from base to point; the general pelt is of a dull yellowish brown, mixed with some black hairs on the head, neck, shoulders, back, and outer parts of the thighs; the dorsal line is darker; the throat, the forearms anteriorly, the tail, and a lateral line along the flanks, dusky black; as is also a line running backward from the commissure of the lips; anterior part of the face, inside of the ears, shanks, belly, and croup-mark, white. In winter the pelt becomes thicker and darker coloured, the markings being more decided. The young are of a more yellow tinge than the old, and the croup-mark is

of a pale yellow instead of being white. In temper and disposition the mouflon is extremely intractable and vicious; and, though inferior in size to many domestic sheep, is far more powerful and energetic. Those which we have seen have been stupid and malicious; indeed, it was not safe to approach them, as they would rush forward, and butt with all their force, repeating their terrible blows with great rapidity; captivity, instead of rendering them tame and familiar, seemed to make them vicious and confident in their strength.

It has been frequently asserted that the mouflon breeds with the sheep; it may do so in confinement, but we are not aware of any instance of the kind taking place in the gardens of the Zoological Society; nor does it appear to interbreed with the domestic sheep of the islands and districts which it naturally inhabits. Pliny it is true mentions a mixed breed between this animal and the domestic sheep, called Umbri, but of these we have no information.

Mr. Blyth informs us that the male mouflon is denominated in Corsica *mufro*, and the female *mufra*, from which Buffon, as is well known, formed the word *mouflon*. In Sardinia the male is called *murvoni*, and the female *murva*; though it is not unusual to hear the peasants style both indiscriminately *mufion*, which (as Mr. Smyth remarks in his description of that island) is a corruption of the Greek *ophion*.

There is a mouflon in Cyprus, figured and described by MM. Brandt and Ratzeburg, from a specimen in the Berlin Museum, which Mr. Blyth considers distinct from the Sardinian animal, and to which he has given the scientific appellation of *Ovis Ophion*.—*Proceeds. Zool. Soc.*, 1840. It differs in being of a darker colour generally, there being no rufous cast on the pelt, and in the horns being smaller, and neither diverging so much nor assuming so spiral a curve. How far it is truly distinct, and not a mere variety, we have no means of ascertaining.

The highest mountain ranges of Armenia and Persia are the native range of a noble species of mouflon, called the Armenian mouflon (*Ovis Gmelinii*, Blyth), which was described and rudely figured in the *Reise durch Russland* (vol. iii.) of the younger Gmelin, and the skull and horns, forwarded by that naturalist to St. Petersburg, have been figured and described by Pallas in his *Spicelegia* (fasc. xii. p. 15, tab. v. 1.) Fine specimens of the male, female, and young, from Erzeroom, are preserved in the museum of the Zoological Society.

The Armenian mouflon equals an ordinary sheep in stature, but is covered with a remarkably short pelt (perhaps the summer dress) of a lively chestnut colour, deepest upon the back; the limbs are whitish, with a few traces of dark markings;

the under parts generally are whitish, except that on the male there is a line of black and somewhat lengthened hair running down the front of the neck, and widening to a large patch on the breast. In both sexes a stripe of grizzled black, consisting of mingled black and white hairs, is placed above the knee-joint of the fore-limbs anteriorly; the tail is small and slender. The horns of the male are subtrigonal, compressed, and very deep, with strongly-marked rugæ; they diverge backwards, with a slight arcuation near the tips, which incline inwards; they measure about twenty inches over the curvature, and are ten inches in circumference at the base. The space round the eyes, and the muzzle, are whitish; the chaffron is dusky. This elegant mouflon is a native of the elevated districts of Armenia and north-western Persia, where it occurs in troops; the female breeds in March, producing two or even three lambs at a time. The males are very pugnacious, especially during the month of September, and engage in desperate combats, insomuch that Gmelin saw spots completely strewn with horns that had been knocked off in these encounters, which often ended in the death of one of the parties.

It would appear that a distinct and as yet undescribed mouflon or wild sheep inhabits the central parts of Persia, which Mr. Blyth thinks may possibly be the wild type of the domestic sheep. It is described by Sir John McNeill as having the horns contorted into more than one spiral circle; and in his communication to Mr. Blyth, he adds, "I think I am not mistaken in supposing that I have had females of this species brought to me by the huntsmen, with small horns resembling those of the ewes of some of our domestic sheep; but on reflection I find that I cannot assert this positively, though I retain the general impression." Until this species be more fully known, it is impossible to give any decided opinion respecting it. One thing, however, is remarkable, it inhabits the same mountains as the paseng or wild goat (*Capra Ægagrus*), the origin of our domestic races. There are many wild sheep or mouflons tenanted the mountains in the neighbourhood of Nishapore. Fraser (*Journey through Khorasan*) states that while in the village, a ram of this wild breed was killed by one of the hunters and brought to him as a present. He describes it as a noble animal, just what it might be conceived the finest sort of domestic ram would be in a state of nature, bold, portly, and very strong; thick like a lion about the neck and shoulders, and small in the loins; covered with short reddish hair that curled closely about the neck and fore-quarters, and bearing an immense pair of crooked and twisted horns; its flesh proved to be remarkably well-flavoured.

Was this sheep the *Ovis Gmelinii*, or was it a distinct species, and referable to that indicated

above? Unfortunately the details given are not sufficiently precise for us to say whether it was the *Ovis Gmelinii* or the contrary; but the curled hair and the immense crooked horns are certainly points of difference between it and the specimens of *Ovis Gmelinii* in the museum of the Zoological Society.

A very remarkable mouflon is described by Mr. Vigne, as inhabiting the mountains of Little Thibet, where it is termed *Shà*; it is also found in the Sulimani range between India and Khorasan, and is there known under the name of *Koch*. This species, the *Ovis Vignei* of Blyth, is allied to the Corsican mouflon, but is much larger and proportionally longer in the limbs. It has a conspicuous fringe of lengthened blackish hair down the front of the neck, and not lying close, as in the Corsican mouflon. According to Mr. Vigne, this species is about the size of a fallow-deer, and in general appearance, length of leg, and swiftness, resembles rather the deer than the sheep.

No perfect specimens of this species exist in any of our museums; specimens of the horns, however, have been received, of which a full-grown pair measures fully thirty-two inches over the curvature, and eleven inches in circumference at the base; they are subtriangular, and do not spire, but diverge and describe three-fourths of a circle, pointing not forward but towards the back of the neck. In the horns of a younger animal, however, the spiral flexure is more decided; but slight differences in the flexure of the horns occur in other species.

"The general colour of the animal, to judge from an elaborately-finished painting, taken from a living individual in its native country by Mr. Vigne, to whom we are indebted for all we know concerning the species, is a rufous brown, apparently not so deep as in the common mouflon. The face is devoid of the rufous tinge of the body, and not terminated by a white muzzle; the belly is white, separated from the sides by a black lateral band, and the limbs are brown and not mottled, but with a whitish ring above each hoof, then a dark ring, and above this a little white posteriorly. The fringe in front of the neck is doubtless peculiar to the male, and the hairs of it would appear to be four or five inches long, and hang loosely. The tail is about six inches long, slender, and apparently resembling that of the Armenian rather than that of the Corsican mouflon."—*Proceeds. Zool. Soc.*, 1840, p. 71.

According to Mr. Vigne, "vast numbers of this species are driven down by the snow in winter to the branches of the Indus, near Astor, at the southern extremity of Little Thibet, where the river breaks through the chain of the Himalaya. I once (he adds) saw a young one apparently of this species in Persia, but took no memorandum

of it at the time; it was dirty and dragged, but I think was covered with short wool."*

Mr. Hodgson describes a species of wild sheep under the name of *Náhoor*, which inhabits the Kâchan region of Nepál. This species is found also in Thibet, where it is denominated *Snà* (*Ovis Náhoor*, Hodgson). This species equals or exceeds the largest domestic sheep in stature, the adult male measuring thirty-two inches in height at the back; the horns are pale, large in the male, thick and spirally contorted; small and compressed in the female, or even wanting. The general colour is dull brownish-gray; Mr. Hodgson says of a dull slaty-blue, obscured with earthy-brown, in summer overlaid with a rufous tint; inside of the limbs and hams yellowish-white, croup-mark and edge of the tail white; horns from twenty to twenty-two inches measured along the curve, the points being directed upwards and inwards. The náhoor is bold and active; but, according to Mr. Hodgson, all experiments to produce a breed between this species and the common sheep have failed.

A distinct species, the burrhel (*Ovis Burrhel*, Ogilby; *Supplement to Catalogue of Mammalia in Mus. Zool. Soc.*, Lond. 1839) is a native of the snowy peaks of the Himalaya chain, at a vast altitude. It is smaller and more robust than the náhoor, with shorter ears, and very dark horns recurved, and presenting obsolete stripes. The general colour is dark rich chestnut brown, the face, chest, and front of the limbs being black; a unique specimen exists in the museum of the Zoological Society, respecting which we extract the following communication from Mr. Bicheno, in the *Proceeds. Zool. Soc.*, 1838, p. 79:—"It was killed June 1st, 1836, by Thomas Smith, Esq., 15th Native Infantry, known in India as one of the most intrepid sportsmen and best shots in the country. He met with it in the Great Snowy Range, close to the Barinda Pass communicating with Chinese-Tartary, near also to the famous peak called Jaurnootrie, under which rises the river Jumna. He estimates the height at which he found the animal to have been from 15,000 to 17,000 feet. Humboldt, he thinks, calls the Barinda Pass 18,000 feet. The Hill-men call it Burrhal, and considered this specimen to have been seven years old by the horns. The cry was that of a tame sheep, and no animal is so difficult to approach." The subjoined is an extract from Lieut. T. Smith's Journal;—"I was at last repaid by seeing nine of them (the burrhels) at about 600

* In the *Catalogue of the Specimens and Drawings of Mammalia and Birds of Nepál and Thibet*, presented by B. H. Hodgson, Esq., to the British Museum, (1846,) this species is given as identical with the *banbhara* or *bhaara* of Hodgson, and the *Ovis Hodgsonii* of Blyth. Mr. Hodgson had previously described it as *Ovis Ammonoides*, *Ovis Argali*, and *Ovis Ammon*. Reference is hereafter made to it.

yards, and they saw us. I attempted to get near; but no! They are without exception the most difficult animals in the world to get near; and the air being so rarified I could hardly breathe, my Paharrees constantly falling, and declaring they would die, and begging me to return. About four o'clock, as I was just giving it up in despair, I suddenly came round a peak of snow, and found the large ram, at about 300 yards, looking at me. Despairing of ever getting nearer, and knowing my rifle would do it if only held straight, I beat a place in the snow and laid it along, taking a steady aim, pulled, and to my delight saw him fall on his side and kick; he recovered himself, and crawled into some frightful rock, and there stood, showing me his horns." The animal was not captured eventually until it had received a large number of balls. "Thus I killed," says Lieut. Smith, "the first burrhel ever killed by European or native that I can learn."

The coat of the burrhel is rather long, and harsher than that of the nâhoor, and in winter, doubtless, becomes deep and woolly. The horns measure twenty inches along the curve, and are ten inches in circumference at the base. Mr. Blyth states, that those of a specimen noticed in the *Bengal Sporting Magazine* for 1839, p. 295, were twenty-five and a half inches long, with a basal girth of eleven and a half inches;—and, that be measured a horn of this species, in the possession of Mr. Leadbeater, which was twenty-four inches in length. According to the catalogue

above alluded to, this animal is identical with the nâhoor of Hodgson.

The elevated steppes of Southern Siberia, and the mountain chains of Central Asia, produce an animal, described by Pallas under the name of argali (*Ovis Ammon*), of which, until within the last few months, no specimen has existed in any of our museums. Two noble specimens, male and female, now grace the British Museum, and may be regarded as among the most valuable and interesting of its zoological treasures. Till we saw these specimens we had no idea of so gigantic a sheep; and we felt at once convinced, that had those naturalists who consider some of the domestic races as deduced from it, had an opportunity of seeing a specimen, they would never have entertained such an idea. Huge, heavy, massive, and powerful, indeed, is the argali of Siberia! an ox in stature, but a wild sheep in form and characters. The male stands four feet in height at the back; and, measured from the nose to the end of the short little tail over the head and neck, is seven feet nine inches; the circumference of the horns at the base is nineteen inches, and each horn, measured from its base along the curve to the tip, is three feet eleven inches; the horns are furrowed with deep transverse sulci, and are boldly spiral, diverging somewhat laterally; the limbs are compact and well turned; the ears are small, and the tail is very short. The female specimen is smaller in stature than the male, and the horns are considerably less, both as to length and weight.



GREAT ASIATIC ARGALI.

The pelt is deep, close, and full,—its tint is a grizzled brown; the limbs below the knee are whitish, as is the chaffron, though less decidedly; the lips are grayish; the tail also is grayish, but there is no croup-mark, no pallid disc. Probably the colour varies at different seasons of the year, as is generally the case among the wild sheep.

The horns of the male are triangular, and convex on the upper aspect,—those of the female are more compressed. We suspect these specimens to be in winter clothing; for Desmarest and others, quoting Pallas, describe the pelt as short, and grayish yellow in summer, with a rufous stripe along the back, and a large mark of the same colour on the croup; the limbs internally, and the under parts, being of a pale rufous. In winter the pelt is thick, harsh, and of a brownish gray, passing into white on the muzzle, throat, and under parts.

The argali lives in troops, and is extremely active and vigorous, bold and resolute. In spring and autumn the rivalry of the males is excited, and they engage in desperate conflicts, striking each other on the head with such violence, that they often break off each other's horns, massive as these weapons are, and solidly as they are fixed to the skull. Foxes and small animals take up their abode in the hollow of the dead horns of this animal, which may be scattered about, and there conceal themselves. Had Mr. Blyth personally examined this animal, he would not have suggested its identity with the big-horned or Rocky Mountain sheep of North America, which it greatly exceeds in stature.

The same writer, in his *Monograph of the Genus Ovis*, founds two species on horns which have come under his notice—viz., the rass or roosch of Pamir (*Ovis Polii*, Blyth), and the Caucasian argali (*Ovis Cylicornis*, Blyth).

With respect to the Pamir sheep, he says, "In the narrative of the celebrated Venetian traveller, Marco Polo, we read (in Marsden's edition, p. 142), that upon the elevated plain of Pamir, eastward of Bokhara, which is 16,000 feet above the sea-level, 'wild animals are met with in great numbers, particularly sheep of a large size, having horns three, four, and even six palms in length. The shepherds form ladles and vessels of them for holding victuals. They also construct fences for enclosing their cattle, and securing them against the wolves, with which they say the country is infested, and which likewise destroy many of the wild sheep or goats.' More recently an animal was indicated from report in *Sir Alexander Burnes' Travels in Bokhara* (ii., 208), and its horns have since been transmitted to the Royal Asiatic Society, by Lieut. Wood, of Sir A. Burnes' party, through the medium of G. T. Vigne, Esq. In this magnificent specimen

of a frontlet I recognise, though with some hesitation, the *Ovis Sculptorum* formerly described by me (*Proceeds. Zool. Soc.*, 1840, p. 12), from a horn in the Royal College of Surgeons; but as the characters of that specimen, as originally drawn up by me, have not hitherto been published,—as its flexure too, which suggested the appellation of *sculptorum*, would appear to form a less extended spire than is probably normal,—and as the habitat proves to be different from that anticipated (viz. the Taurus, which I have still reason to suspect contains a large undescribed species of this genus), I propose to dedicate the present splendid animal to the illustrious Venetian traveller of the thirteenth century, by the name of *Ovis Polii*."

The horns he describes as in the seventh year of growth, and as measuring four feet eight inches in length following the curvature, and as fourteen inches and a half in circumference at the base. The single horn in the Royal College of Surgeons is in its eighth year of growth, measures only four feet four inches in length, but is stouter at the base: both are rugose, with transverse striæ. Whether this presumed species be identical or not with the great Siberian argali, we have no means of ascertaining; for, we deem it hazardous to form species upon slight differences in the length, stoutness, or tournure of horns—parts very subject to individual variations; some being more elongated, but less thick at the base,—others, again, shorter, but more robust.

With respect to the Caucasian argali, Mr. Blyth says, "Colonel Hamilton Smith notices this animal in his description of the *Ovis Ammon* (published in Griffith's Edition of the *Règne Animal* of Cuvier, vol. iv., p. 317), and writes me word that an individual died on landing it at Toulon, whither it had been brought by a French consul, who did not preserve the skull or skin, but sent up the horns, which were quite fresh when we saw them. Each horn was about three feet long, arcuated, thick at the top as at the base, of a brown colour, smooth, and about fifteen inches in circumference. They were so heavy and unmanageable, writes Colonel Smith, that I could not lift both together from the ground, nor place them in that kind of juxtaposition which would give me an idea of their appearance on the head. I could not well determine which was the right or which the left horn. Circumstances prevented my taking a second view of them, as they arrived only the day before I left Paris, and they are now, doubtless, in the museum of that capital. The sketch which Colonel Smith has favoured me with, represents a sheep-horn apparently of the same general form as those of the burrhel and nâhoor, but the dimensions specified are very superior to those of either of the two Himalayan species adverted to; and

I can only suppose that the tips had been broken off, and the truncated extremity worn smooth. The wild sheep of Caucasus and Taurus are at present but little known; nevertheless it is certain, from the vague incidental notices of various travellers, that some, and not unlikely several, exist." At Azaz, at the foot of Taurus, Mr. Ainsworth mentions having seen an animal which he designates *Ovis Ammon* (*Travels in Assyria, Babylonia, and Chaldea*, p. 42). We must place the Caucasian argali in the list of undetermined species; it is founded on the description of a pair of horns, apparently imperfect, and of which the precise tournure is not ascertained.

We are not quite certain whether the Siberian Argali inhabits Kamtchatka—probably it does; but if so, a smaller species also exists there, described and figured by Eschscholtz (*Zool. Atlas*, part. i., pl. 1, erster heft) as the *Ovis Nivicola*. This animal is very numerous on the mountains, residing upon the snow-clad heights in summer, and descending to the lower regions in winter; it is very powerful and vigorous, and a notice of its chamois-like agility occurs in the *Narrative of Kotzebue's Voyage*, from 1823 to 1826.

This species is about two feet six or seven inches in height at the back; its outer coat is of a yellowish-gray colour, brighter on the under parts, and inclining to straw-yellow on the head and neck; the markings on the front of the limbs are of a rust colour; the horns are equilaterally triangular, and form a complete spiral circle, with the points directed outwards and forwards; they are marked with deep rugæ. The Kamtchatkan sheep, says Kotzebue, "is amazingly fleet and active, exhibiting itself on the loftiest pinnacles, and achieving, like the chamois, prodigious springs among the rocks and precipices, and consequently is not killed or taken without difficulty. In preparing for these leaps, its eye measures the distance with surprising accuracy. The animal then contracts its legs and darts forward, head-foremost, to the destined spot, where it alights upon its feet; nor is it ever seen to miss, though the point may be so small as to admit its four feet only by their being closely pressed together. The manner in which it balances itself after such leaps is also admirable; our ballet-dancers would consider it a perfect specimen of a *plomb*."

The great peninsula of Kamtchatka, it may be observed, is between the same parallels of latitude, or nearly so, as Great Britain, but from its geological formation and other circumstances, its climate is infinitely more rigid than even that of the most northern parts of Scotland. A chain of lofty mountains, in many parts covered with glaciers and perpetual snow, runs from one end of the peninsula to the other, and is based upon nearly its entire breadth. These mountains are broken

into jagged rocks and tremendous precipices, exhibiting everywhere signs of volcanic violence, while in some places the craters of volcanoes are still in activity, and are seen pouring out smoke and flame, and streams of lava, in the midst of ice and snow. The natives possess no domesticated sheep, but live by hunting and fishing; they chase the argali and the wild reindeer. The Russian settlers have introduced within the last eighty years many vegetables, which grow in favourable spots, as rye, barley, cabbages, turnips, &c. They possess also horses and cattle, but the original natives use dogs to draw their sledges, and are hunters and fishermen.

In the *Journal of the Asiatic Society of Bengal*, for 1841, p. 230, Mr. Hodgson describes a wild sheep of the Himalayan regions, where it is termed banbhêra, and bhaaral (*Ovis Banbhêra*, Hodgs., MSS.) under the title of *Ovis Ammonoides*. This species is the *Ovis Hodgsonii* of Blyth in *Proceedings of the Zoological Society*, 1840, p. 65; and also in the *Journal of the Asiatic Society*, 1849, p. 863. Mr. Hodgson regards this sheep as distinct from the Siberian argali, which, however, it resembles in general characters, and approaches in size. The horns, which are sub-compressed, massive, and strictly trigonal at the base, measure forty inches along the curve; the mean height of the animal is forty-two inches; and the length from the muzzle to the base of the tail, seventy-two inches; the tail, including the hair, measures eight inches. The general colour is dull slaty blue, paled on the surface, and more or less tinted with rufous; the dorsal ridge is dark coloured, or embrowned; the lips, chin, and under parts, dull hoary; externally the limbs are hoary, with a rufous tint.

This sheep may be identical with the great Siberian argali, or *Ovis Ammon*; at all events, if different, it is a closely allied species; but in truth, the wild sheep of Central Asia, and the Himalaya range, are among the desiderata of our museums,—nor is it likely, until we obtain a series of the specimens of each so-called species, that we shall be able to arrive at complete certainty respecting them. Mr. Hodgson, for example, asserts that the burrhell of Mr. Blyth, or Mr. Ogilby, is identical with the nâhoor; against which opinion Mr. Blyth (*Journal of the Asiatic Society, Bengal*), in a note upon Mr. Hodgson's observations, successfully contends. We should scarcely, in a work like the present, have alluded to this point, were it not that it goes to prove the uncertainty which still envelopes the wild species of the genus *Ovis*,—that genus which has afforded us so many breeds of domestic sheep, the precise origin of which still eludes scientific inquiry. It is somewhat remarkable, that nearly all the genera to which our domestic quadrupeds are referable, are the

least thoroughly understood,—we may, perhaps, except the canine and feline groups; but yet, who has demonstrated the wild stock either of our domestic cat, or our faithful intelligent dog? As for the ox, the horse, and even the ass, can we positively point out their original type? Where is the wild camel? There are, however, some animals, as the hog, the rabbit, and the llama, the unreclaimed strains of which we may truly be said to be acquainted with;—still, with regard to the domestic hog, it would seem, that, intermingle as our numerous varieties may, these breeds, such as Chinese, Indian, and Papuan, have a different specific origin. The obscurity which shrouds the primitive condition of man, when he went forth to labour, and exercise dominion “over the fish of the sea, and the fowl of the air, and over all the earth,” is surely equalled by that which invests the natural history of the domestic quadrupeds—creatures with which he so early surrounded himself, and in which so large a portion of his real wealth consists. Perhaps we ought to ask the readers pardon for this digression.

Leaving the old world for North America, two species of sheep in that portion of the Western Continent claim our notice; of these we shall first describe the Rocky Mountain sheep (*Ovis Montana*, Desmarest), so admirably figured by Dr. Richardson in the *Fauna Boreali-Americana*.

It was an idea thrown out by Cuvier (*Règne Animal*) that this fine species was an argali, which might have passed from Asia over the ice-bound sea at Behring's Straits, and so have arrived in the northern regions of America; and this idea is followed up, though with some hesitation, by Mr. Blyth, who had not an opportunity of seeing the true argali, with which to compare the present species. Admitting it as probable that the Siberian and the Rocky Mountain animals are not the same, though closely resembling each other, he points out a common peculiarity, arising from the magnitude and curvature of the horns, viz. that, as Mr. Drummond affirms, the horns of the old rams of *Ovis Montana* attain a size so enormous, and curve so much forwards and downwards, as effectually to prevent the animal from feeding on level ground—a circumstance which had been previously remarked by Strahlenberg of the argalis of Siberia, and no doubt is equally observable in the rass of Pâmîr. In some of the rams of our own domestic breeds, we have known the horns so prominent, as to require the aid of the saw in order to enable the animal to feed at ease.

The male Rocky Mountain sheep, when full grown, measures three feet four or five inches in height at the shoulders, and its horns have a proportionate magnitude. Among the specimens of horns in the Zoological Society's Museum, there is a pair of extraordinary size, each measuring, along

the curvature over the front ridge, three feet five inches, the circumference at the base being seventeen and a half. They are nearly equilaterally triangular and gyrate, and are strongly furrowed transversely with bold annuli between the furrows.



ROCKY MOUNTAIN SHEEP.

The colouring of the Rocky Mountain sheep varies according to the season of the year. The old males are totally white in spring, as is the fine specimen in the museum of the Zoological Society, but at other seasons the pelt is of a fulvous white, tinged with umbre, the face, the chest, and the limbs being marked with brown; the tail, which is very short, being surrounded by a pale or whitish croup-disc. Darker specimens are preserved in the British Museum, agreeing with Desmarest's description, viz. chestnut-brown, except on the cheeks, which are of a pale chestnut, or rufous, and on the croup, which is purely white, or rather, we add, whitish. We may describe the specimens in the British Museum as of a dark gray-brown tinge, the limbs to the hoofs being of a dark brown, with a distinct croup-mark. Age, as well as the season of the year, seems to influence the general colour of this species, and, probably, of all the wild sheep. The Rocky Mountain sheep, or Bighorn, appears first to have been discovered by the Fathers Piccolo and De Salvatierra, when, in 1697, they established the first mission in California, nearly two centuries after the first discovery of that country.

“We found,” says Father Piccolo, “two sorts of deer that we know nothing of; we call them sheep, because they somewhat resemble ours in make. The first sort is as large as a calf of one or two years old; its head is much like that of a stag, and its horns, which are very large, are like those of a ram; its hair and tail are speckled, and shorter than those of a stag; but its hoof is large and round, and cleft as that of an ox. I have eaten of these beasts; their flesh is very tender and delicious. The other sort of sheep, some of

which are white and others black, differ less from ours; they are large, and have a great deal more wool, which is very good, and easy to be spun and wrought." By this latter sheep is meant either the Rocky Mountain goat (*Rupicapra Americana*, Blain.) or rather, as we think, the Californian sheep of Douglas (*Ovis Californianus*, Dougl.) Dr. Richardson, in reference to the above notice, observes, "Hernandez, Clavigero, and other writers on California, likewise mention these animals, and Vanegas has given a figure of the first-mentioned one, which has, though evidently on insufficient grounds, been considered to be the same with the Siberian argali." Dr. Richardson objects that the term *speckled* hair does not agree with any descriptions that he has met with of the Rocky Mountain sheep, and that, as far as he had heard, no black individuals are ever met with in the herds of the Rocky Mountain goat. Nevertheless, we cannot but think that by the former, speckled as its hair is described, the Rocky Mountain sheep, or a near ally, was the animal indicated by Piccolo; nor is the vague term speckled any formidable obstacle. The colour of the pelt of this animal, which is more or less fulvous, tinged with umbre, resides in the ends of the hair, and as these are rubbed off during the progress of the winter, or lose their colouring, a grizzled or irregularly-tinted appearance will be presented, till the pure white, which the old rams assume in winter, is the result; but besides this, as it is only the old rams that become white, we have reason to suspect that the females and young are really more or less parti-coloured, sufficiently so to lead a person, writing loosely, and not a naturalist, to call the animal *speckled*.

Though skins of the Rocky Mountain sheep were brought by Captain Cook from the north-west coast of America, and also imported by the North-West Fur Company, it was not until 1803 that the attention of naturalists was drawn towards the animal, by a paper published in the *Medical Repository*, of New York, by Mr. M'Gillivray, who had previously procured skins on the mountains in which the Elk river takes its rise, whence others have also since been procured, as well as from the mountains skirting the south bank of the Mackenzie. From one of the specimens procured by Mr. M'Gillivray, which was first deposited in the New York Museum, and afterwards sent to France, M. Geoffroy published a figure and description in the *Annales du Museum*, entitling the animal "Bélier Sauvage d'Amérique." The fine specimens in the museum of the Zoological Society, presented by Dr. Richardson, were obtained on the banks of the Mackenzie.

The Rocky Mountain sheep, according to the last-mentioned traveller and zoologist, inhabit the lofty chain of mountains whence they derive

their name, from its northern termination in latitude 68 degrees to about 40 degrees, and most likely still further south. They also frequent the elevated and craggy ridges with which the country between the great mountain range and the Pacific is intersected, but they do not appear to have advanced farther to the eastward than the declivity of the Rocky Mountains, nor are they found in any of the hilly tracts near to Hudson's Bay. They collect in flocks, consisting of from three to thirty; the young rams and the females herding together during the winter and spring, while the old rams form separate flocks, except during the month of December. The ewes bring forth in June or July, and then retire with their lambs to the most inaccessible heights. Mr. Drummond informs me that in the retired parts of the mountains, where the hunters had seldom penetrated, he found no difficulty in approaching the Rocky Mountain sheep, which there exhibited the simplicity of character so remarkable in the domestic species; but that where they had been often fired at they were exceedingly wild, alarmed their companions on the approach of danger by a hissing sound, and scaled the rocks with a speed and agility that baffled pursuit. He lost several that he had mortally wounded by their retiring to die amongst the secluded precipices. Their favourite feeding places are grassy knolls, skirted by craggy rocks, to which they can retreat when pursued by dogs or wolves. They are accustomed to pay daily visits to certain caves in the mountains that are encrusted by a saline effervescence, of which they are fond. These caves are situated in slaty rocks, and it was in them alone that Mr. Drummond found the *Weissia macrocarpa* growing. The flesh of the Rocky Mountain sheep is stated by Mr. Drummond and others who have fed on it, to be quite delicious when in season, far superior to that of any of the deer species which frequent the same quarter, and even exceeding in flavour the finest English mutton. The Kamtchadales, in like manner, esteem the flesh of the argali as an exquisite delicacy.

The propensity for salt exhibited by the Rocky Mountain sheep, is not peculiar to this species; it is evinced by all the species of the genus *Ovis*, and, as is well known, by domestic sheep. The great Siberian argali is said to repair in the spring to the salt marshes which are so abundant in the wilds of Siberia and Tartary.

That the Rocky Mountain sheep and the Siberian argali are truly distinct species can no longer be considered as questionable. The former is exclusively a native of the north-western regions of North America: the latter inhabits Asia, the mountain ranges of which are the great nursery of the wild species of the genus *ovis*.

The next species to which we have previously

alluded, is the Californian sheep (*Ovis Californicus*, Douglas), of which specimens of the horns, referred to by Mr. Douglas, in his observations in Zoological Journal, vol. iv., p. 332, are preserved in the museum of the Zoological Society. The Californian sheep stands two feet eight inches in height at the shoulders. The horns of the male are lunate, compressed and comparatively smooth; they measure each from twenty-four to thirty inches in length—(those in the museum are thirty-two inches, following the curve along the front ridge, and fourteen and a half inches in circumference at the base); they are comparatively smooth, and of a yellowish tint. The pelt consists of short fine wool, of a yellowish white, intermixed with longer brownish coarser hairs. Hair on the head short, and fuscous brown; ears obtuse.

"Of the manners of this majestic animal," says Mr. Douglas, "I can say nothing, never having had an opportunity of seeing it alive. From the testimony of the Indian tribes about the falls of the Columbia river, it appears to inhabit the sub-alpine regions of Mount's Wood, St. Helens, and Vauclouwer, but is more numerous in the mountainous districts of the interior of California. The only good skin that ever came under my observation (in lat. $46^{\circ} 14' 55''$; long. $121^{\circ} 170' 0''$) was that of a male, apparently recently killed, which I saw on Sunday, Aug. 27, 1826." These horns are, as we have said, now in the museum of the Zoological Society.

According to Mr. Douglas, the horns of this animal are converted by the Snake Indians into bows, spoons, and cooking-utensils. It is to this species most probably that Mr. Forbes alludes in his work on California, under the name of *Be-rindo*, which in Mexico is applied to the *Prong-horn* (*Antelope furcifer*, *vel palmata*. Ham. Smith). He states that these animals still abound in the plains at the foot of the mountains, and are always found in large herds.

Reviewing this catalogue of the wild species of the genus *ovis*, there does not appear to be one which has any definite claim to be regarded as the type of the domestic sheep. In all the mouflons and argalis the tail is short; but in the domestic sheep, at least as far as most breeds are concerned, the tail is long, and is naturally composed, according to Cuvier, of fifteen vertical bones, or, as Mr. Youatt says, of from twelve to twenty-one, varying in different breeds. This length of tail in an animal, which long domestication has so greatly modified, may perhaps be regarded as an unimportant circumstance—nor indeed should we lay any stress upon it did we find a parallel case in the instance of the goat, an animal, the domestic breeds of which are endlessly diversified in stature, horns, and clothing. May we not then expect to find the wild type of the sheep more closely re-

sembling in this respect the domestic race; for though we will allow that domestication may cause a diminution of bones in a part of little importance, and a retrenchment of the organ they support, we should not expect to find an increase of their number, and that characteristic of so many breeds. In this respect the difference between the short-tailed mouflon and one of our sheep, the tail of which, in its natural condition, is elongated almost to the ground, is very striking. We cannot help thinking that should the origin of our domestic stock be discovered, it will be distinguished from all its congeners by its length of tail. Often, when looking at the undocked mountain sheep of some of our moorland hills, animals active as goats, with their spiral horns, dusky-brown faces and limbs—here and there a rusty-brown individual appearing amongst the rest—we have said to ourselves, "Surely these cannot be very remote from their primitive type; they are wild as it is, and were circumstances so to combine as to leave them in a state of emancipation, they would never become changed from what they are." We do not mean to defend this opinion, for it is founded only on our own impressions or feelings; yet we think that the wildest animals of our tame races, placed as far as possible in a state of nature, will always show some outbreak of their freeborn progenitors. There is a tendency in our domestic animals to return to their type, and those who breed "fancy animals," as rabbits and pigeons, know well the art and experience required in keeping up their stock to its full degree of artificial perfection. They proceed on the principle of *like producing like*, and in their selection of breeders, and in the adjustment of the qualities of the individuals destined to keep up the strain or improve it, they display no little judgment and concern. Let them neglect their stock, and it soon returns to their old condition. These observations apply equally to the sheep, of which the most uncultured (those that roam upon our wild moorlands and there breed, generation unimproved succeeding generation) may, and perhaps do, approach the nearest to the primitive type. Certainly they exhibit address, vigour, and independence, and so far lead us to conclude that the sheep is not, by nature, the timid irresolute animal which it is in an artificial state of existence, dependent upon man for care, for protection, and for food. "It can scarcely be doubted," says Buffon, "that the animals in a state of actual domestication have been formerly wild—those whose history we have given have furnished us with the proof of it—and at the present day wild horses, asses, and oxen are still to be found. But can man, who has subjugated so many millions of individuals, boast that he made an entire conquest over one species? As all have been created without his participation, must we not believe that

all have the capability of growing and of multiplying without his succour? Nevertheless, if one considers the weakness and the stupidity of the sheep; if one reflects at the same time that this animal, without the means of defence, cannot even find safety in flight; that it has for its enemies all the beasts of prey, which seem to seek it by preference, and to devour it with satisfaction; and besides, that this species is not very productive, and that each individual lives only for a limited period, we shall be tempted to imagine that from the beginning the sheep was confided to the guardianship of man, that it needs his protection in order to subsist, and his care to multiply; since, in fact, we find no wild sheep in the deserts; that in all places where man does not govern, the lion, the tiger, the wolf reign by force and by cruelty; that these animals of blood and carnage live much longer and multiply much more than the sheep; and that finally, if we abandoned at the present time in our land the numerous flocks of this species which we have caused to multiply so greatly, they would soon become destroyed under our eyes, and the entire species annihilated by the number and voracity of enemies." Such is Buffon's mode of reasoning; forgetful of what the sheep is by nature, and looking only to what it is under the culture of man. Like the mouflon and argali, it is formed to tenant the mountain range, to make the precipitous crags its home, and there to find an asylum. If the wild type of our domestic race be ever found, it will be in such a locality, on the range of the Caucasus or the Altaic chain.

It is somewhat remarkable, numerous as are the fossil relics of oxen, that so few fossil remains of the sheep have been discovered in the strata where their preservation might have been expected. Mr. Blyth states that two crania of sheep, apparently male and female, from the Irish peat, in the possession of the Earl of Enniskillen, were exhibited some time since at a meeting of the Zoological Society, and he attributes them to a wild breed which Hector Boëtius (1526) states inhabited the island of St. Kilda, adding that they were larger than the biggest goat, with the tail hanging to the ground, and with horns longer and not less bulky than those of an ox. What these sheep may have been we cannot tell—probably emancipated domestic animals; but we do not pretend to assert it as a fact. Mr. Pennant, in reference to this statement of Boëtius, observes, that such an animal is figured on a bas-relief taken out of the wall of Antoninus near Glasgow. We cannot but regard the wild sheep of the Feroe Islands as an emancipated race. Mr. Wilson (*Quarterly Journal of Agriculture*, vol. ii., p. 542) observes, that Dicuil, who wrote in 852, describes these islands as containing numerous flocks, and that, according to Landt, those of the principal island

are black, with short curled wool and dark flesh, the taste of which closely resembles that of other wild animals. Mr. Wilson adds, that when Mr. Trevelyan visited the Feroe Islands in 1821, he found there the remnants of the wild race; these animals were altogether independent of man; occasionally they were caught with dogs, but could seldom be obtained except by being shot, or intercepted in some narrow space and driven over the cliffs. They had short wool, and the flesh though lean was palatable. In the Azores, where there are numerous flocks, many sheep exist in a state of wildness, and this probably is the case in other places also, suitable to their existence in a state of freedom.

Professor Owen, in his valuable work on *British Fossil Mammalia and Birds*, figures a portion of the skull of a goat, with compressed horn-cores, found in the newer fresh-water pliocene, at Walton, Essex, and contemporary with the *Bos primigenius*, and *Bos longifrons*. "The horn-cores," he observes, "closely agree in shape with those of the common goat, and also of those of the female of the true wild goat (*Capra Ægagrus*);" and he adds, "I have been favoured with some remains of the goat from a bog in Fermanagh, by the Earl of Enniskillen; but as the evidence of there having been obtained from the subjacent marl was not conclusive, they may have belonged to a comparatively recent period. Remains of the goat, associated with those of the ox, red-deer, hog, horse, and dog, were found in the bed of the Avon, in sinking the foundations of a bridge over that river, near the town of Chippenham. Bones of a goat, or sheep, similarly associated, have been transmitted to me by Dr. Richardson, from a gravel-pit in Lincolnshire." We cannot say positively, that the "*crania* of sheep from the fresh-peat," and in the possession of the Earl of Enniskillen, noticed by Mr. Blyth, are identical with "the remains of the goat," sent to Professor Owen by the same nobleman; but if they are not so, Professor Owen has omitted all notice of them, probably because he did not regard them as true fossil relics. This absence of the fossil remains of the sheep (for those which have been positively identified belong to the goat) in our pliocene deposits, leads us to presume, that when mastodons, and elephants, huge hippopotamuses and rhinoceroses, gigantic deer, wild horses, bison, and uri, enormous bears, and hyænas, tigers, and feline animals, with sabre-shaped canines, wandered over the plains, wallowed in the marshes, or skulked in the caves of that portion of Europe which now constitutes England, and we may add, of the adjacent continent, no wild sheep was of their number; or, at least, that if a wild sheep existed, it was confined to isolated spots, and prevented by the carnivorous animals from becoming generally spread, or numerous even where it might maintain a footing.

Granting, however, the existence, in remote ages, of a species of wild sheep in our island, we have no reason to believe, that itself passing away, it has left a domestic lineage preserved by the care of man from sharing the fate of the original wild stock. As far as we can retrace the history of man on the globe, we find the sheep in his possession; and, though all details respecting its reclamation and its spread are buried in oblivion, we know that it did spread, and if we except the aborigines of America, and of the islands of the Southern Ocean, and the dwellers within latitudes unpropitious to its existence, it became the property of the human race. When, or by what people, it was introduced into our island, no records remain to declare; and it is somewhat remarkable that Cæsar, though he alludes to horses and chariots, to oxen, to domestic fowls, and geese, does not allude to the sheep, or the use of its wool in the manufacture of fabrics. Yet we cannot doubt that the ancient Britons were in the possession of this animal; for when the subjugation of the island was completed, and general tranquillity began to prevail, the Romans, turning their attention to the improvement of the country, and the cultivation of its commercial resources, established woollen manufactories at Winchester—and it would be absurd to suppose that the wool made use of was imported, and not of native growth. So successful was this experiment, that the woollen cloths of Britain soon began to be celebrated,—no other part of the empire could produce such fabrics; the finest and most expensive dresses worn on days of festivity, or on occasions of ceremony, were of British manufacture. As Winchester is seated in the centre of a district fitted only for the support of short-woolled sheep, it is reasonable to conclude that the material used was chiefly, if not entirely, the produce of these sheep. Supposing even that some portion of the wool was imported from Gaul, still we suspect that short wool was the material, inasmuch as wool for forming densely felted but unwoven fabrics, so thick and solid as to resist the stroke of a sword, was there extensively used, and thence most probably exported to the southern districts of Britain,—if, indeed, Britain received any at all from the Gallic territory. It was, indeed, said, that the British wool was often spun so fine as to resemble a spider's thread; and this has led some to believe that the celebrated woollen stuffs of Britain, under the Roman dominion, were the produce of the long-woolled breed of sheep—a breed undoubtedly of high antiquity, and ever deemed most valuable for the production of a combing and spinning material; indeed Dyer, in his *Fleece* says—

"If any wool peculiar to our isle
Is given by Nature, 'tis the comber's lock,—
The soft, the snow-white, and the long-grown flake."

From this delicacy of the spun wool, noticed by Dionysius Alexandrius, and from the impression respecting the antiquity of the long-woolled breed, some conjecture that the woollen manufactories of Winchester were supplied by a wool of long staple; and it has been alleged, that as antique customs do not easily pass away, and peculiar manufactories, established in a distant age, on certain spots, still maintain their ground,—and that as there still exist in the neighbourhood of Winchester, factories for the production of fine worsteds, the ancient fabrics of Winchester were composed of this material. But when we consider that Winchester could only procure on the spot the produce of short-woolled sheep (represented in our day by the Dorsets, the Wiltshires, and the Southdowns),—that from time immemorial, manufactories of short-woollen goods have been established there,—and that there the first guild of fullers was chartered in the reign of Stephen, we think that the conclusion, as to the stuffs of the opulent of Rome being short-woolled, is the most probable. Begun before or at least during the Roman dynasty in our island, the manufacture of woollen stuffs doubtless continued in a flourishing condition for many centuries, in fact till the withdrawal of the Romans, A.D. 426 (Cæsar's first invasion having occurred B.C. 55). What changes during this period, if we take our date from the time of Agricola (A.D. 71, 80), took place among the British races of sheep,—what changes, and what improvements in the manufacture of woollen stuffs, we have no means of ascertaining; but of this we are certain, that when Britain became an integral portion of the Roman empire, the arts of social life, dependent upon civilization, received a rapid impulse; the skins of wild beasts or of domestic animals, no longer clothed the woad-stained aborigines; towns usurped the place of woad-concealed kraals, and sordid huts were exchanged for mansions of elegance and luxury. Then, too, did the sheep become trebly important; and haply, some native Briton, as he surveyed his flocks, mused upon the *Georgics* of Virgil, familiar alike with his own language and that of the elegant poet.

But fiercer times were to come. The Romans were withdrawn, we may say, from the land of their birth, from their British ties and kindred,—for time had greatly intermingled the conquerors with the conquered, and the Romans were so by law and lineage rather than by birth; but, as we said, the political necessities of Italy required their presence, and Britain had to sustain the ravages of the natives of Caledonia, the Picts, and the Scots. Then came in (A.D. 449) the Saxons—the rest need not be told. Now, when the Saxons divided Britain among themselves, driving the Britons to Wales and Cornwall, did they destroy the manufactories which the Romans had

encouraged? or if not, did they permit the persons engaged in them to remain, or did they themselves carry them on, pursuing the business of the prior possessors? History does not enable us to answer the question, but we may form a conjecture from analogy. A rude and barbarous people adopt the arts of the more civilised whose lands they have usurped, nor are all the conquered driven from their wonted homes and habitations, although, perhaps, forced into bondage. "When the Anglo-Saxons," says Sharon Turner, "invaded England, they came into a country which had been under the Roman power for about four hundred years, and where agriculture, after its more complete subjection by Agricola, had been so much encouraged, that it had become one of the western granaries of the empire. The Britons, therefore, of the fifth century, may be considered to have pursued the best system of husbandry then in use, and their lands to have been extensively cultivated with all those exterior circumstances which mark established proprietorship and improvement—as small farms; enclosed fields; regular divisions into meadow, arable, pasture, and wood; fixed boundaries; planted hedges; artificial dykes and ditches; selected spots for vineyards, gardens, and orchards; connecting roads and paths; scattered villages and larger towns; with appropriate names for every spot and object that marked the limits of each property, or the course of each way. All these appear in the earliest Saxon charters, and before the combating invaders had time or ability to make them, if they had not found them in the island. Into such a country the Anglo-Saxon adventurers came; and by these facilities to rural civilization, soon became an agricultural people. The natives whom they despised, conquered, and enslaved, became their educators and servants in the new arts, which they had to learn, of grazing and tillage; and the previous cultivation practised by the Romanized Britons, will best account for the numerous divisions, and precise descriptions of land, which occur in almost all the Saxon charters."—(*Hist. Anglo-Saxons*, iii., App., No. 2.)

Celebrated as were the Britons for their manufacture of woollen stuffs, this art, as well as the arts of grazing and tillage, would be one which they would teach their rude conquerors—perhaps those peculiarly skilful in it would be constrained to pursue their calling for the benefit of the latter; and thus local spots in which manufactories had flourished during the time of the Romans, would continue to be, as before, the seats of the art in question.

That we should hear little respecting sheep or wool during the earlier part of the Saxon period of our history is not surprising; we learn, however (Stillingfleet's *Chronicon Pretiosum*, p. 50), that about 712, until fourteen nights after Easter, the

price of the sheep was estimated at one shilling, of forty-eight Saxon shillings to the pound. This sum, about five-pence, small as it now appears, was not so at that date, nor for a long period afterwards; for, according to Anderson (*On Commerce*), it was the estimated value of a sheep in the time of Ethelred, that of a horse being thirty shillings, or one hundred and fifty pence, an ox thirty pence, or five shillings, a hog eight-pence, and a goat two-pence, consequently the value of a sheep, viz. five-pence, was proportionally greater than that of an ox.

The spinning of wool was an employment pursued by the Anglo-Saxon females of the highest rank, and they attained to a great degree of skill in the ornamental work belonging to clothing. The mother of Alfred is reported to have been skilled in the spinning of wool, and also to have diligently instructed her daughters in the same art. Alfred, in his will, denominated the female part of his family as the *spindle-side*, and from their habitual employment unmarried females were then termed spinsters; and the term, one of honourable derivation, is still continued, though the practice is obsolete.

Edward the Elder, who ascended the throne A.D. 900, "sette his sons to scole, and his daughters he sette to woll-werke."

In the Dialogues composed by Afric of Canterbury, who lived in the latter part of the tenth century, and which are preserved in the Cotton Library, a shepherd is represented as thus describing his duties:—"In the first part of the morning I drive my sheep to their pasture, and stand over them in heat and cold with dogs lest the wolves destroy them. I lead them back to their folds and milk them twice a-day, and I move their folds, and make cheese and butter, and I am faithful to my lord." Now, there are several points of information to be gleaned from these scattered notices, bearing not only upon the habits and manners of our Saxon forefathers, but upon our more immediate subject. The general practice of spinning wool among the females of all classes, from the princess to the peasant's daughter, prove that England must have at that time possessed extensive flocks. Many of the franklins were no doubt rich in sheep, as well as in swine and oxen; they kept shepherds to watch their sheep, accompanied by fierce dogs capable of contending with the wolf, which, in spite of the shepherd's vigilance, too often committed depredations among them. These sheep were regularly folded, and the folding-places changed; the ewes were milked twice a-day, and both butter and cheese were procured. It is evident that great attention was paid to sheep, and that they were highly valuable—not so much on account of their flesh, for mutton does not appear to have been then in estimation, but

on account of the fleece and the milk. We learn, moreover, that even at that early time two races of sheep must have existed, a race with short wool, from which cloth was made of great fineness in the manufactories established in various parts of the kingdom; and a long-woolled race, the fleece of which was especially fitted for hosiery and woollen goods. It was this that was used by the spinsters of the olden time, while the fullers of Winchester (the birth-place of the manufacture of wool in the time of the Romans) required wool of a contrary character.* Thus, then, at this early period, and even antecedently, two breeds of sheep, characterised by the opposite quality of their fleeces, one fitted for the comber, the other for the manufacturer of cloth and the fuller, that is

of felting property, established in our island. The value of both herds was fully appreciated, and English wool was celebrated for its fineness and superiority. So it continued during the reign of the early Norman kings, and woollen manufactories were then established in many parts of the kingdom.

Thus, then, as far as we can retrace the annals of the island of Britain, do we find the tame sheep cultivated by the inhabitants, and regarded as one of the most important of their domestic animals; but whence or how it was obtained, whether any wild stock there existing indigenously was reclaimed, or whether it was brought by the early colonizers, or afterwards acquired by traffic, are points upon which history throws not a gleam of light.

CHAPTER III.

A GENERAL REVIEW OF THE DOMESTIC RACES OF SHEEP.

BEFORE we enter more particularly into a history of the British sheep, it will be proper for us to take a general survey of this animal as it exists in a state of domestication, and trace out how far climate, cultivation, and a combination of other circumstances have contributed to produce in it the most extraordinary varieties—varieties which almost lead us to question, as indeed some do, whether all be the descendants of one stock.

We must look at the domestic sheep (*Ovis Aries*, Linn.) as an artificial being—it is what man has made it; and, like the dog, it shows the effects of his culture, persisted in through a long succession of ages. We are accustomed to regard the sheep as a purely wool-bearing animal; but was it so originally? was it not, like the mouflon, covered partly with rigid hair and partly with wool, the latter becoming developed in winter? and is not the fleece which it bears in our climate, the result of culture, of temperature, and pasturage? We know that the latter influences the character of the fleece, irrespective of temperature; that certain lands are fitted for long-woolled sheep, while others are expressly adapted for short-woolled races. We know that, on the adjacent continent, different sheep are found in the same region. Sir Joseph Banks imported three sheep from Spain which had no wool; they “were sleek and smooth

as a horse, and never, in any season, showed the least signs of wool or down in the most minute quantity.”—(*Bath Society Papers*, vol. viii., p. xi.) Yet Spain produces the celebrated Merino breed, reared on the great flats of Estremadura and Andalusia, where they are depastured during the winter; being driven, on the approach of summer, to the mountains. Besides these is the Chuanah breed, a large, tall, heavy race, with long, coarse wool, destitute of any curl. Here, then, we have sheep, clad with wool of a different character, under the same climate; there are breeds co-existing in every part of Europe between which a similar line of demarcation may be drawn.

With regard to climate, there can be no doubt that it affects the proportion of the wool to the hair, and influences the relative quantity, as well as the fineness and quality of the former. Regions which suffer neither the extremes of heat nor of cold, or in which, by a change of pasturage from lower to more elevated grounds, the heats of summer can be neutralized, and, by a reverse proceeding, the severities of winter can be moderated, seem most favourable for the development of wool. If we look at the sheep in very cold latitudes, we find it clad in an outer garment of coarse hair, beneath which lies an under layer of wool, which becomes fuller and longer in winter. Such is the case in the ordinary breed of Iceland. That this breed might be improved by care we are quite willing to admit; due shelter and a proper supply of food during winter, with general good management, would probably effect a considerable change; judicious interbreeding, care, industry, and intelligence will overcome the difficulties of climate. It is

* It is remarkable that after a lapse of upwards of nine hundred years since the ultimate departure of the Romans, the cloth manufactory at Winchester continued to flourish; and that in the time of Stephen (A.D. 1140) both the weavers and the fullers were elected into separate guilds, the former paying one mark of gold annually (about 30*l.*), the latter 16*l.* (equal to 240*l.* or 250*l.*), for their liberties and customs, and a right to elect their own aldermen.—See *Madox's History of the Exchequer*.

thus that the Merino race preserves its excellencies alike in Spain, in Germany, in Holland, and even in rigorous Sweden. The influence of *breed* under proper management will overrule the natural adverseness of climate; and thus man, by pursuing a well-regulated system, may conquer the intense severity of winter. These remarks apply equally to the sultry regions of the globe, where the sheep, gaunt and lank, are covered with short hair, sometimes with long hair, sometimes with hair intermingled with a little wool. Some breeds of Indian sheep however are clad with a fleece of wool, and the Merino breed is extensively cultivated in the colony of the Cape of Good Hope. It must be acknowledged however that the difficulty of contending against a sultry climate is far greater than that of contending against a climate of just the opposite description, as far as the rearing of fleece-covered sheep is concerned; and sheep of the best breeds imported into the hotter parts of the globe will rapidly degenerate. The establishment of the Merino sheep in the Cape colony, though neither pains nor expense were spared, was at first by no means attended by success, and was only effected by perseverance and unremitting attention.

It is remarkable that in the countries of Nepál and Thibet, where wild moultons and argalis tenant the mountain ranges, breeds of sheep bearing wool of surpassing excellence, are kept in a state of domestication. Mr. Hodgson (*Proceeds. Zool. Soc.*, 1834, p. 99) informs us that the wool of the *Huniah*, or Bhotean domesticated sheep, is superb; and suggests that attempts should be made to naturalize the race in England. This sheep, he adds, is suited only to the northern district of Nepál, as it suffers much from the heat of the central district. In the *Journal of the Asiatic Soc. of Bengal*, 1842, p. 284, Mr. Hodgson figures and describes this variety of sheep, which he there terms the Hoonia (*Huniah*) or black-faced sheep of Thibet. "Vast flocks," he states, "of the graceful and valuable Hoonia are reared all over Thibet for food, for clothing, and carriage, and almost exclusive of any other breed. They flourish in the Kachar of Nepál, though not south of it; and even in the Kachar their wool degenerates. To procure the Hoonia from north-eastern Thibet ought to be an object of zealous endeavour on the part of the Agricultural Society, which should also obtain the Kachar breed of the same animal,—the former for export to Europe, for it would not live in India; the latter for attempts at crossing with the common long-tailed breed of Gangetic India. The goat and sheep of the Hemáchal and Thibet have the finest fleeces in the world,—the goats and sheep of the plains of India almost the worst."

To improve the sheep of India is certainly a desideratum; but we confess that to naturalize in our own island the splendid *Huniah* breed would

be of far greater importance. We cannot expect wool from India, but to improve any breed of European sheep is a matter of importance; and to give publicity to the *Huniah* or Hoonia sheep of Thibet may be the means, perhaps, of inciting those who have the power at command to introduce some of these celebrated animals, of which little, indeed nothing, is known in our country.

The *Huniah* sheep is of large size, slender, flat-sided, with a short narrow tail, and spirally twisted horns; some individuals have three, four, or even five horns. It is probable that this breed would flourish in our island, as would also that described by Mr. Moorcroft (in *Trans. Royal Asiat. Soc.*, vol. i., p. 49) under the title of the *Pürík* sheep. He states that the *Pürík* sheep of Ladakh (a province of Thibet) yields not in merit to any race discovered, both as to the fineness and the weight of the fleece, and also as to the flavour of the mutton, its feeding properties, and its constitution. The ewes give two lambs within the course of twelve months, and the flock is twice shorn during the same period. This is probably only a variety of the *Huniah*. There are other breeds of sheep in Thibet, of which the most common is a variety of the fat-rumped Persian sheep, with short hair and a little wool beneath; the head and legs are generally black. Costly shawls are made in India from the fine, long, and delicate wool of the fleece-bearing races of Thibet, of which the *Pürík* sheep appears to be conspicuous. Here again we have a marked instance of the difference of breeds inhabiting the same country.

As the fleece of the primitive sheep consisted of wool and hair, we cannot be much surprised that under certain circumstances one of these becomes developed at the expense of the other, nor that, when the constitutional tendency to produce wool is established, it does not readily give way to the preponderance of hair, and *vice versa*. Thus even in Guinea, if the Abbé Demanet be correct (*Hist. d'Afrique*, Paris, 1787), two varieties of sheep are reared, one of which is covered with wool, and has a long fat tail, while the other is larger and stronger, and covered with shaggy hair like a goat. Travelers, however, do not allude to this woolly breed, but describe the sheep as clad with hair, and having a mane on the neck, with wattles under the throat, and pendulous ears.

We have spoken of the celebrated lambskins of Bucharía, with their beautiful wavy glossy fleece, so much esteemed throughout Russia, Tartary, Thibet, China, Persia, &c. According to Dr. Anderson (*Bath Society Papers*, vol. viii.), the term fleece is not strictly applicable in this instance; for, upon examination, he found the beautiful material to consist of nothing else but hair, without the smallest intermixture of wool; and we suspect that the ringlets of the lambskins,

prepared by the inhabitants of the Ukraine and Podolia, are truly hair. The lambs are born with a wavy pelt, and often prettily marked; to increase the beauty and value of this, they are sown up in a sort of linen vest, which keeps up a constant and gentle pressure on the skin. This vest is saturated every day with warm water, in order to make the pelt soft and sleek; and as the animal grows it is slackened from time to time, but not too much relaxed; for the object is to press the pelt into permanent ringlets. The animals are killed at different stages of the process, according to the material intended to be produced; that is, either a short glossy nap like silk, fit only for delicate linings, or a thick warm fur for winter clothing. —(See *Anderson on the Russian and Tartarian Sheep*.)

To the long-haired silky breed of the Bucharian Tartars, the Cretan or Wallachian sheep



WALLACHIAN SHEEP.

(*Ovis Aries*, var. *Strepsiceros*), common in Crete, Wallachia,* Hungary, and the western parts of Asia, appears to be allied. A few years since a splendid specimen from Mount Parnassus was presented by Dr. Bowring to the Zoological Society of London. It was certainly a noble animal, but extremely vicious and unruly and of amazing strength. The horns very large, and spirally contorted, adding greatly to its striking and picturesque appearance. In this specimen, they extended laterally from the skull, and after the first turn took a downward sweep; but this was an exception to the common rule, for in general the horns of the male rise almost perpendicularly from the skull, making a series of spiral turns in their ascent, the first turn being the largest. In the female they are smaller than in the male, and are said to diverge. We may conclude, however, that individual variations, with respect to the direction of the horns, occur in this breed; indeed, as

we have sufficiently seen, the more trivial characters of the sheep in its domestic state are unfixed, and capable of modification.

The fleece of this animal consisted of an undercoat of short wool, and an upper vest of very long and beautifully fine white hair, falling from the middle of the back on each side of the animal, almost to the ground. On the face the hair was short, close, and of a rusty black colour.

Specimens of this sheep, though a native of Eastern Europe and the adjacent parts of Asia, have been very rarely brought into England—we may add, the proximate countries across the channel. We do not remember to have seen a specimen in the Museum of Paris, nor is there, we believe, one in the British Museum. Buffon, in the third volume of the supplement to his great work, gives a figure of the male and female of this curious race, from a drawing sent him by Mr. Collinson of London, from whom he was in the habit of receiving communications on subjects of natural history; but no information relative to this sheep is given. Yet it would appear that this race was known in ancient times, and is alluded to, in the opinion of some, by Oppian and Pliny. With respect to the latter writer this is very doubtful. In the eleventh book indeed (cap. xv.), he describes an animal called *strepsiceros*, with horns erect, lyre-shaped, pointed, and wound round by a spiral wreath of rugæ. This animal, which he adds is called *addax* (or *addas*) in Africa, is undoubtedly the antelope, still called *abu-addas* or *abu-akasch* by the Arabs.—(*Antelope addax*, Licht.)

It is time, however, that we turn to some of the more singular varieties of the domestic sheep, of which there are several the existence of which can be traced up to the remotest antiquity. In *Leviticus* (chap. viii. ver. 25), Moses, it is said, “took the *fat* and the *rump*, and all the fat that was upon the inwards,” &c., “and burnt them on the altar.” And in another place (chap. ix. ver. 19) we read that he took the fat of a bullock, “and of the ram the rump,” and “he burnt the fat upon the altar.” From these and other expressions it may be inferred that the croup of the sheep of ancient Syria was loaded with a deposit of fat, and such a breed extensively prevails in the eastern parts of Europe, in Palestine, in the deserts of Tartary, and indeed extensively throughout Asia. Of this breed are the flocks of the Kalmucs, Kirguise, and Tartar tribes composed. A writer in the *Agricultural Magazine* for 1804 thus describes the Kirguise and Kalmuc breeds:—In the mountainous districts, he observes, they are higher than a newborn calf, and so strong and heavy that the full-grown ones weigh between four and five poods; that is, between 144 and 180 pounds (the pood being 36 pounds). They have the arched front of the old battering ram, prominent under-lips, and

* The ordinary Wallachian sheep is of the broad-tailed race, and not the *Ovis Strepsiceros*.

large pendulous ears.* Instead of a tail they have a monstrous round of fat, like a cushion, weighing 30 or 40 pounds, and yielding between 20 and 30 pounds of tallow. Their wool is coarse, entangled together, and strongly mixed with hair. The rams are universally, and the wethers generally, horned, and some, like the Icelandic, have four, five, or six horns. During the whole winter they seek their fodder under the snow, without losing their condition during its continuance; for not only is the season short, but the snow passes away on the salt parts of the steppes more rapidly than elsewhere, and all animals are fattened by feeding on vegetables of a saline soil. So rich is the country with sheep, that common Tartars often possess a thousand, and some of the richer ones more than fifty thousand. "The Kalmuckian sheep differ from the Kirguise in their smaller size, less curved forehead, less hairy wool, and being seldom horned. They are sadly neglected, and indeed it is in a manner impossible to compel the Kalmucs to be good agriculturists."

From the river Volga to the Irtysh, and thence to the Altaic chain of mountains, the *steatopygous* breed of sheep prevails, differing in minor points as to size and the quality and character of the wool. Throughout this immense tract, where saline pastures afford food, acrid and bitter aromatic plants abound, as wormwood and various species of saltwort, besides grasses adapted for such situations. The Turcomanic shepherds are migratory, driving their sheep to different pasture lands according to the season of the year, preferring those districts where the soil is impregnated with salt, affording a luxuriant but peculiar vegetation. Some of the Kalmuc and Kirguise rams have four or even six horns, and the cushion of fat on the crupper weighs from thirty to forty pounds. These numerous horns, and this enormous deposit of fat, are characteristic only of the sheep fed in the saline districts; for on certain grounds near the Volga, where the pastures are not saline and the snow lies deep during the winter, the sheep are not only small but often hornless, and the deposit of fat on the croup is materially diminished. In other parts of the Tartarian wilds where there is no saline impregnation, the sheep though large have but a moderate proportion of fatty deposit on the croup, though the pasturage is excellent; nevertheless, as it is not saline, it does not produce that peculiar vegetation which seems to be immediately connected with the inordinate accumulation of fat on the croup, so characteristic of the Kalmuc and Kirguise races.

We have here then a striking example of the

* "As the shepherd taketh out of the mouth of the lion two legs, or a piece of an ear."—*Amos*, iii. 12. By the expression "piece of an ear," we are led to infer that the ears of the sheep were large and pendulous, as are those of the Syrian goat, to which perhaps the passage may more directly refer.

effects of pasturage in originating and in establishing a peculiar breed of sheep—a breed which existed in the earliest ages, and continued to maintain its ground while in other countries very different breeds sprung up, and improved or deteriorated, or became modified in various points, but which have never exhibited the Kirguise or Kalmuc peculiarity. This peculiarity is not incapable as we have seen of modification, and in time and by management might be obliterated.

When sheep of the *steatopygous* breed are transported into the interior districts of Russia, the change they experience in food and mode of life produces a decided effect, and the croup loses almost all or at least a great proportion of its fat. It appears to be in fact, as is observed by Pallas, to the influence of the bitter saline pastures of Tartary through a number of generations, that the gradual augmentation of the deposit of fat on the croup is owing—a disposition connected with a dwindling away of the tail to a little button. Pallas farther observes that the diminution of this mass of fat in the sheep of several of the Tartar hordes is owing to the little wormwood there is in those districts, and the small quantity of salt with which the pasture is impregnated. These facts cannot be uninteresting to the practical farmer, inasmuch as they are the most remarkable proofs of the influence of pasturage in modifying breeds; not only in rendering animals well grown or fat, or in altering the quality of the flesh or of the milk, but in disposing the system to deposit fat on certain parts, and in entailing this disposition upon a whole race so that it becomes their hereditary characteristic.



STEATOPYGOUS SHEEP.

In the Tartarian *steatopygous* sheep, the head is heavy, the horns large, angular, wrinkled, and spirally twined. The neck is long and rather thin, especially at its base, where it joins the chest. The brisket is deficient, and loose skin, forming a sort of dewlap, hangs from it. The limbs are

long, and the general contour gaunt but muscular. The ears are pendent. The wool is mixed with hair.

An allied but hornless breed of smaller size is found in Persia, of which living specimens have existed in the gardens of the Zoological Society. Anthony Jenkinson, who travelled from Moscow to Khorasan in the sixteenth century (see *Hakluyt's Collection*, vol. i., p. 329), describes the Persian sheep as being of great stature, with a mass of fat on the croup weighing sixty or eighty pounds; but we suspect this to be an exaggeration; no modern travellers describe any Persian domesticated sheep of such a magnitude.

A fine race of the Persian breed may be thus described:—General colour white, excepting the head, the sides of the neck, and the throat, which are black. General contour excellent. The wool is short, rather curled, coarse and mixed with hairs. The carcase is rounded, the back straight, the limbs small and clean, the neck descends well to the chest, and the effect is increased by lax skin, forming a dewlap along the throat and brisket. An enormous mass of tremulous fat covers the croup or saddle, and descends over the upper part of each ham, with a fissure at the upper part of which appears a short tail.

From the excellent points about this sheep we cannot doubt that the breed is capable of great improvement, more especially as it regards weight of carcase, excellency of flesh, and aptitude for early fattening. A change of pasture and climate would soon reduce the accumulation of fat on the croup, and careful interbreeding would tend to its equalization generally. Those who have tasted the mutton of these sheep in Persia, affirm it to be excellent. The soft and marrowy fat of the croup forms a dish in great repute; it is often boiled with rice, and in cooking it serves as a substitute for lard or butter, and is also employed for burning in lamps.

An allied race of sheep called the Fat-tailed (*Ovis Aries*, var. *Laticaudata*) is found in Syria, Bucharra, China, Egypt, Æthiopia, &c., and appears formerly to have extended to Southern Africa. Among these sheep certain minor differences prevail, both as to the character of the fleece, stature, and the mode in which the fat is deposited on the tail; some having the fat more especially confined to the upper part, others having it more equally disposed over the whole of the tail, which hangs to the ground, the lower part or tip of which is often naked. In some the deposit of fat is moderate, in others it is enormous. All the breeds appear to be horned, and to have pendent ears.

In the *Bedouin* sheep the ears are pendent, and the tail is long and rather thick but by no means overloaded with fat; in the Syrian fat-tailed race on the contrary the tail is somewhat flattened, with a lobe of fat on each side; it narrows suddenly

at the tip, which is turned up, so that it does not touch the ground. The average weight of the tail of this sheep is from twenty to thirty pounds. Villamont, however (*Voyage*, lib. iv., p. 628), states that he saw some in Syria which weighed thirty-three pounds and upwards. Russell describes two breeds of fat-tailed sheep about Aleppo; in one the deposit of caudal fat is moderate, in the other sort the tail is much larger, and it is this kind to which travellers more particularly allude in their descriptions of sheep with enormous caudal appendages. Some of these sheep are very large and heavy, and by feeding attain to the weight of one hundred and fifty pounds, but such animals are rare, and are kept up in yards, in order to prevent any injury occurring to their tails, which are very broad and large, and terminate in a



LONG FAT-TAILED SHEEP.

small recurved tip or appendix. He farther informs us that when these sheep are fed in the fields, the shepherds in several places of Syria fix by way of protection a thin board to the under part of the tail, and to this board are sometimes attached small wheels; hence, with a little exaggeration, we have the story of the oriental sheep being under the necessity of having carts to carry their tails. He adds however that there is a necessity of carriages for the tails of the African breed, as mentioned by Herodotus, Ludolphus, and others, because their tail does not turn up at the tip, but actually drags on the ground. Ludolphus states that he saw a sheep's tail weigh eighty pounds in Egypt; and Symon Simion speaks of sheep-tails in the same country weighing seventy pounds; but this enormous mass was produced, according to Russell, by high feeding the animals with bran and barley.

In the more populated parts of Syria flocks of sheep are not often seen; but a few, the property of several owners, may be often observed, usually with a string round the neck of each, by means of which they may be led to pasture and fastened up

when at home. They are led about in gardens and vineyards, and out on the mountain side, a boy or a girl being usually in attendance on each sheep. "In the evening," says Paxton, "I have often seen them bringing the sheep to the springs and pools of water, and pour the water plentifully over them, I suppose to cool them." In some places the sheep are fed at home, chiefly upon mulberry leaves, which are squeezed up into small balls and put into their mouths. These sheep are much valued and greatly petted, and like other domestic favourites appear to be conscious of their importance, and jealous of other animals; they are generally tied up near their owner's door, and they stamp and butt at all dogs that venture to approach near them.

In Syria little meat excepting mutton is eaten, and excepting during a few weeks in the spring it is fat and well flavoured; the lamb in spring is excellent. The Arabs, and also the townspeople, have a way of preserving mutton by boiling it and potting it in large earthen jars, covered up with its own suet, which is poured in a boiling state upon the meat pressed down in the jar.

The marrowy fat of the tail is highly esteemed; it is mixed with lean meat in many of their dishes, and is also used instead of butter; the latter, we need not repeat, is the produce of the milk of the goat and the sheep.

As mutton is almost the only animal food consumed in Syria, a regular and abundant supply, especially for the large towns, is very requisite. It is calculated that 60,000 sheep are annually consumed in Aleppo, the population of which amounts to about the same, thus making the consumption one sheep a year for each person; that is, as it regards sheep alone, what the same population in an English town (as it is calculated) will consume. Inasmuch however as beef, veal, and pork are to be taken into consideration, which are not eaten in Syria, the consumption of animal food altogether may be estimated at four times as much on the average for each person as in Aleppo. This demand in the towns of Syria for mutton renders the business of the sheep-grazier profitable; indeed sufficient sheep are not reared in Syria for the supply of the towns and villages, and great numbers are imported from Northern Arabia, from Erzeroum, and Mesopotamia. We learn from Dr. Bowring's *Report* that "there are brought annually from Erzeroum and Mesopotamia about 80,000 sheep for the consumption of Syria, the greater part of which are sold at Hamah, Homs, Damascus, and in the South. The price varies according to the demand from 65 to 80 piastres (13s. to 16s.) each, making for 80,000 a total sum of 5,600,000 piastres (£56,000). The sale is effected partly for cash and partly on credit. The returns for this amount are made mostly in

specie in new and old gazzis, which is a heavy drain on the capital of Syria. For the quantity furnished by Arabs and other pastoral populations for the consumption of Syria, there is an exchange of commodities which is mutually beneficial; but for the supplies received from Erzeroum and Mesopotamia the balance of the trade is wholly discharged in gold. Ibrahim Pacha attempted to apply a remedy to this by increasing the number of sheep produced in Syria. He published an order that no lambs were to be killed for one or two years, for it had been the custom to kill the lambs while very young. It is very doubtful whether the measure has done anything towards producing the desired effect. The supplies from Mesopotamia have not decreased, and the price of mutton in every part of Syria is from 3 to 3½ piastres per oke (about 2½d. per pound); so difficult is it by legislation, however despotic, to force production and give direction to capital independent of profit. To prohibit the killing of lambs was to increase the demand for them, and consequently to increase the evil it was intended to cure."

To return from this digression. We have already stated the characters of the Egyptian sheep; they are of the thick-tailed race, and this breed is continued through Nubia, where however it is intermixed with the steatopygous race, resembling that of Persia; and this kind of sheep prevails in Abyssinia.

The periodical overflowings of the Nile give rise, at least in Nubia and Abyssinia, to a peculiarity in the management of the flock which is not a little singular. On the subsidence of the Nile, the humid soil, beneath a glowing sky, becomes covered as if by magic with a luxuriant and succulent vegetation, on which the flocks are driven to feed, and on which they fatten with astonishing rapidity but not without danger; the soil is treacherous and exhales deleterious miasmata, the effects of which soon begin to manifest themselves by the drooping of the flock. As soon as the Bedouin shepherd perceives this, and he is watchful for the first symptoms of the disease—a species of rot—he collects his charge, and drives them back to the sandy deserts, where, feeding on bitter, dry, and stimulating herbage, they gradually recover their health, without having lost their good condition. Should any however continue to droop, they are killed before the disease proceeds so far as to render the flesh useless or unsaleable. Bruce describes the sheep of Nubia and Abyssinia as producing mutton remarkable for the excellence of its flavour.

A broad or fat-tailed race of sheep prevails in the provinces of Adel and Ajan, and also in the island of Madagascar. Formerly the Cape sheep were all of this breed. Barrow describes them as being long in the leg, small in the body, and thin

in the fore-quarter. The fat appeared to be all collected on the croup and on the tail, the latter being broad, flat, and naked on the under side; its average weight was from six to twelve pounds; the fat he describes as semi-fluid like butter. Such were the sheep of the Hottentots and the Caffre tribes, and such are still those of the Dutch boors or farmers, whose wealth consists in herds and flocks.

The Cape sheep vary greatly in colour, most are spotted or mottled, but some are brown, and some black; their necks are small, and their ears long and pendulous. Those fed on the inland pastures, where there is good grazing, weigh from sixty to seventy pounds, but few in the barren country about the Cape much exceed forty pounds. Their felt is coarse and frizzled, and is used principally for cushions and mattresses; it is suffered to drop off (which it does in September and October), for these sheep are never sheared. Of the skins garments are made, and also bags or sacks for various household purposes. Burchell (*Travels in Africa*) informs us that "when these skins are properly dressed and cleaned, and a number of them sewed together, they form a much warmer covering than could be made from any other materials. The richer inhabitants, and those of Cape Town, who can afford themselves more expensive coverings, affect to dislike the cheaper *Koombaar*, the name given to this garment, because they say it smells of mutton; but the boor (or Cape farmer) is enabled by his immense flocks to select such only as have a smooth fur, and so he obtains a handsome coverlet, so unlike what a European would imagine for sheep's skins, that it may be doubted whether many persons would even guess from what animal it was made. Those that have been brought to Europe have been viewed as the skins of some unknown quadruped. Few furs can be more beautiful than the selected skins of lambs thus prepared." The unctuous fat of the tails of these sheep is accounted a great delicacy alike by the boors and the Hottentots, and many persons use the melted fat instead of butter; it is also made into soap by boiling it with the lye of the ashes of the salsola. In their primitive condition, while yet they claimed the country as their own, the Hottentots possessed immense flocks as well as herds, and pursued the pastoral arts with great success. Nor are they now, in their changed and fallen state, less excellent as shepherds and herdsmen. Those entrusted with the flocks of their masters know each individual sheep, and have their attention so sharpened by practice, that if one out of several hundred sheep be missing its loss is immediately perceived. This faculty appeared to surprise Burchell, who paints a cavalcade of flocks returning home at evening, which must indeed have

been a pleasing spectacle. "It was," he says, "an interesting sight to behold, a little before sunset, the numerous flocks streaming like an inundation over the ridges and low hills, or moving in a compact body, like an army invading the country, and driven forwards only by two or three Hottentots and a few dogs. At a great distance the confused sound of their bleating began to be heard; but as they approached nearer and nearer the noise gradually increased, till the various cries of the multitude mingled with the whole air and deadened every other sound. The shepherds seldom returned home without bringing under their arms a lamb or two which had been dropped in the course of the day, and were as yet too weak to follow their dam. The faculty which the Hottentots possess of distinguishing the features as it were, and the characteristic appearance of each sheep, is almost incredible, and they seldom mistake the ewe to which each lambkin belongs." What a beautiful picture for the artist—the myriads of sheep; the distant ridges, gilded by the setting sun, in a cloudless sky; the wide plain; the peculiar vegetation; and the Hottentot shepherds with their watchful dogs!

With regard to the mutton produced by the South African sheep we have some difficulty in forming a correct estimate. We have been informed that at Cape Town it is very inferior, but the pasture land round Cape Town is confessedly bad, and the sheep that feed upon it are poor; while the long distance which the sheep fed in the more interior parts of the country have to travel before reaching Cape Town, cannot tend to the maintenance of their flesh in anything like condition, the more especially as they change good quarters for bad. Thunberg (*Second Journey to Caffraria*) says, "When a butcher has purchased a flock of sheep and driven them one hundred and thirty or one hundred and fifty miles to the Cape, they are generally reckoned fat enough to be killed." We must not now forget that as far as the nature of the country will admit, circumstances have greatly altered since Thunberg's time, and that perseverance has at last accomplished the naturalization of the Merinos.

Returning to Asia, we may observe that the breed of Bucharina, from which the far-famed lambskins are procured, appears to be intermediate between the steatopygous and the fat-tailed breed. Of this breed we know little except from the accounts of Pallas, from whom we learn that it resembles the ordinary Russian sheep in stature, the ears are large and pendent, there is a small deposit of fat on the croup, and the tail is fat and broad at the base, but it gradually narrows and terminates in a slender appendage. The wool is described as being compact, thick, soft, and elastic, and regularly formed into frizzled circles.

In the lamb the fur or pelt appears in little delicate circles close to the skin, and wavy, like silk damask, as if art had been employed to give it an exquisite finish.

Dr. Anderson in the *Bath Society Papers* (vol. viii.) described this silky pelt as consisting of hair, but in his work on sheep, p. 55, he regards it as wool, and observes that there cannot be a clearer proof of the pureness and trueness of wool (than the circular wavy character); for if any hairs mingle with it, they are always observed at the birth of the lamb, and being then more fully grown than the wool, often give to the fleece an unsightly shaggy appearance.

A fleece of this character he considers might be rendered extremely valuable under proper management, but no attempts at improvement can be expected to be undertaken by a Tartar tribe, who consider themselves amply remunerated by the sale of the lambskins, and who would of course take no step likely to produce any alteration in their quality. We doubt indeed whether it would be wisdom in them to attempt any alteration, the success of which, as far as their welfare and traffic is concerned, would be very doubtful.

Besides the steatopygous sheep of Persia to which we have already alluded, a fat-tailed race still more extensively prevails; of these sheep the flocks of the migrating pastoral tribes of the mountain land of Khorasan in the north of Persia, and of Kerman in the south, consist. The wool of these sheep is remarkable for its brilliancy and for its peculiar spiral curl; its colour is gray, or mingled black and white, sometimes black, and its length differs in various breeds; in some the wool is curled close to the skin, in others the wool is rather long, and curled only at the extremity, while in others again the wool, which is still longer, falls in numberless close glossy ringlets, the appearance of which is singularly elegant. The finest and most expensive furs are obtained from the unweaned lambs, they are in great request, and often sell at an enormous price; the skins next in value are procured from selected sheep not exceeding a year old; those of older sheep are less valuable; and the skins of least value are used by the poorer classes.

The skins are dressed with the wool on, and afterwards cut into narrow strips which are sewed up and made into pelisses, called *posteens*, and other articles of dress; the most expensive pelisses are made from the choicest portions of the best skins; and from these to the coarsest are various intermediate grades. Black is the colour preferred for caps; a celebrated manufactory of these articles of dress so much needed in Persia during the severities of winter, is carried on at Kaborghan in the mountains north of Khorasan. Besides these dresses, the manufacture of fine felt carpets,

or *numuds*, is carried on both in Khorasan and Kerman. These *numuds* are thick, soft, of fine quality and stamped with rich patterns upon a natural grayish or stone coloured ground. Woven carpets, similar to Turkey carpets, of great beauty and durability, are also made in Persia, and are very valuable. There are large carpet manufactories at Herat.*

The wandering and pastoral tribes of Persia feed principally on the produce of their flocks; the sheep yield them milk, from which cheese is made, and also a liquid butter termed *raughan*; the latter is sold throughout the country.

In India, various breeds both of the steatopygous and fat-tailed races of sheep occur, generally of small size, with coarse wool, suited only for rugs and coarse articles of clothing. There are several other breeds also; in the Mysore country there is a hornless breed with small pendent ears, and fine wool with numerous curves, well adapted to many purposes. In some parts the sheep are lank, ill-shaped, and short-horned, with long pendent ears and wattles under the throat, and a long slender tail; the pelt is close and hairy. According to Colonel Sykes, the variety of sheep most extensively bred in Dukhun (Deccan) has short legs, a short thickish body, and an arched chaffron. The wool is short, crisp, and coarse, and is almost universally black. In most individuals there is a white streak or line from the anterior angle of each eye towards the mouth, and a white patch on the crown of the head. (See *Proceeds. Zool. Soc.*, 1831, p. 105.) The goats in the same territory stand high on their legs, have the sides much compressed, and are covered with long shaggy hair, which in most is black. It is rather remarkable that both the goats and the sheep of the Deccan should be of this colour. The wool of the Deccan sheep is fitted only for coarse goods; it is very inferior in felting properties, and can never become important in commerce.

Several breeds of sheep are distributed throughout the extensive empire of China. Some are long-legged gaunt animals, with an arched chaffron and curled horns, and a sort of mane on the neck and shoulders; the general colour is reddish brown, the wool is short and coarse, and the tail is long. In the more southern districts various breeds of steatopygous sheep prevail, some of which yield beautiful wool; there is also a small race approximating to the European sheep in general characters, and producing an excellent long wool with a very glossy fibre. Excellent serges are manufactured from this material. In Chinese Tartary both the steatopygous and fat-tailed sheep are

* The wool which grows at the roots of the hair, in many breeds of Persian goats, is exceedingly fine, and is manufactured into stuffs and shawls almost equal to those of Cashmir. Shawls are made at Kerman, and form an article of important traffic.

found. The former are divided into various breeds differing in the quality of the wool and the number of the horns; many have four and some six horns, and there are generally wattles of skin under the throat.

We need scarcely observe that our knowledge of China and of Chinese Tartary is very limited; we cannot pretend to enumerate the breeds of sheep scattered over that vast portion of Asia.

Before we leave this part of our subject, we cannot omit the notice of certain breeds peculiar to Africa, very different in their characters from the fat-tailed sheep which we have already described.

Turning first to Angola, Congo, &c., several races appear to exist in that country, besides the fat-tailed breed so extensively spread in Africa. One of these is called the *Zunu*. It is a tall and long-limbed animal, covered with short close hair, with a convex chaffron, small sunken eyes, very large pendulous ears, and small horns which at first decline and then turn inwards and upwards. The general colour is of a pale brown, the head, throat, legs, and under parts of the body, and inferior part of the tail, being white. In this sheep the withers are elevated, and the chest is narrow, but the false ribs project and give a singular breadth to the region of the loins. The fat, which is soft and unctuous, is deposited in such a manner as to render the animal most extraordinary in its appearance. A small collection occupies the loins and part of the croup, but a larger mass is placed on the poll, commencing at the base of the ears and extending backward, forming a rounded swelling half way down the neck under the jaw; and commencing just behind the angle of the mouth is another collection of fat, producing a bagging tumour which has given rise to the appellation of *goitred* sheep applied to this variety, which does not appear to be met with in any other part of Africa.

Another sheep is termed the *Coquo*. It is hairy, but has under the hair a great proportion of fine wool, which by good management might become greatly developed. The tail is long and slender. The general colour is white spotted with brown. There are other sheep also, covered with loose brown hair, and having wattles under the throat.

In Guinea two or three breeds of sheep appear to exist; one of them is of small size, covered with hair like a goat, elongated on the neck and croup, and forming a tuft at the end of the tail. The flesh is said to be very dry and insipid.

The most common breed, however, is of large size; in the male the horns form a semicircle with the points forward; the females are hornless; the ears are pendulous, and wattles hang from the throat. The colour is variable, but more or less black occurs about the sides of the head and neck, and it has been remarked by Colonel H. Smith (*Griffith's*

Cuvier) that in proportion as this colour spreads the horns decrease in size. The hairs along the back of the neck are elongated into a thin mane; the tail is long and slender. This sheep is the *Adimain* of Boddaert. "This sheep," says Desmarest, "the largest, and especially the highest on the limbs of all our domestic sheep, approaches the nearest of any other to the mouflon in the form of the chaffron, and especially in the nature of its pelt, which has nothing of a woolly character. The Dutch first naturalized this sheep in Texel and Friesland, where, crossed with the common sheep, it became the origin of the large race without horns known under the names of *Mouton Flandrin*, or *Mouton du Texel*, and of which the wool has a certain degree of fineness and especially of length, and of which the ewes regularly produce several lambs every year."—(*Mammalogie*.)

This naturalization occurred in the beginning of the seventeenth century. These strange sheep were first crossed with some of the large native breeds, and their offspring with English long-woolled sheep, and especially the Romney. The result is a singular race with pendent ears, no horns, long but not fine wool, and considerable stature. They are very prolific, and yield a more than ordinary quantity of milk, from which cheese of fair quality is produced. To this mixed breed we shall have occasion hereafter to revert. On what principle or with what specific object this eccentric cross was originally made, is more than we can say; it could not have been with a view to the improvement of wool, nor yet to the improvement of the flesh; for what in either case could have been expected? Perhaps (and it is what we incline to believe) no views or principles were involved in the intermixture; there might have been a vague impression that the tall, gaunt, hairy sheep of Africa would by crossing produce a large breed, and this was to a certain degree the result, but had not the English sheep contributed to the amelioration of the mongrel stock, the experiment must have been an utter failure.

North of Guinea is the vast territory of Soudan or Nigritia, skirting a sea of sand, stretching from the western coast to the banks of the Nile and its tributaries. This immense desert is studded with oases or comparatively fertile spots, tenanted by Arabs and other tribes, as Tibboos and Tuaricks, who possess horses, camels, and flocks. Throughout this extent of country a breed closely allied to the Guinea sheep, or identical with it, exists. In Tibboo, Bornou, and Soudan these sheep are distinguished by the name of *Majiggy*. Of this breed is the Fezzan sheep, of which we have seen a specimen in the gardens of the Zoological Society. It was a gaunt ill-formed animal, flat on the sides, high on the legs, with the withers elevated, and the croup falling; the ears were pendent, the horns

semicircular, the chaffron arched, and the tail long and slender; a dewlap hung from the throat and chest, and the hair was coarse and shaggy.



HAIRY FEZZAN SHEEP.

Fezzan is a sterile country, rocky and hilly, with no rivers and few natural springs; scarcely one-tenth of its surface is susceptible of cultivation, and there is no pasturage. Date trees constitute the principal wealth of the country, and on the fruit of these trees the inhabitants chiefly depend. Goats and asses are abundant, and there are also sheep, and a few horned cattle, horses, and camels. The horses and asses are fed upon the fruit of the date, but camels, sheep, and goats are allowed only the stones of the fruit, which the women pound into a coarse powder: upon such diet do the sheep subsist. Murzouk is the capital of Fezzan; and Capt. Lyon informs us that the sheep and goats with which that place is supplied, are driven from the mountains near Benislead, a distance of four hundred miles; in their journey they pass over one desert, which, at their rate of travelling, occupies five days, during which they are destitute both of food and water. The Arabs feed flocks of sheep in the great desert of the Syrtis, occasionally make journeys of an immense length with them, and it is common to trace their route by dead or dying sheep, the victims of fatigue or of thirst and hunger. Some of these sheep are driven to the coast, where they arrive mere skeletons, and a few find their way into Egypt.

It is evident that this tall gaunt breed of sheep is that described by Shaw as the Sahara sheep, distinct from the ordinary fat-tailed sheep of North Africa, and common throughout Barbary. He states that it is nearly as tall as our fallow deer, from which, except in the head, it does not differ materially in shape. Its flesh is dry to the palate, and its fleece is coarse and hairy like that of goats; facts which he attributes to the heat of the climate, the scarcity of water, and the coarseness and hardness of the herbs upon which it feeds. Some of

the Arab tribes in Barbary, during Dr. Shaw's residence there, had, as he states, as many as 12,000 sheep and black cattle; but as the cows are deficient in milk, and become dry when the calf ceases to suck, the great dependence is upon the sheep and goats for the produce of the dairy, and particularly for the production of cheese. Instead of rennet, especially in the summer season, they turn the milk with the flowers of the great-headed thistle or artichoke, and putting the curds afterwards into small baskets made with rushes or with the dwarf palm, they bind them up close and press them. These cheeses, he adds, are rarely above two or three pounds in weight, and in shape and size like our penny loaves. Butter also is made from the milk by agitating it in goat-skins, in one uniform direction, till the unctuous particles separate.

Other breeds, little known, appear to exist in different portions of North Africa, some of which have three or four horns, and some, especially in Morocco, a clothing of true long wool. Little, however, is definitively known respecting them, nor can any judgment be formed from a few isolated examples brought as curiosities to Europe. The common sheep of North Africa generally is the fat-tailed variety, bearing a coarse fleece of variable quality. Such is the breed described by Dr. Shaw as spread over the Levant, and prevailing in Tunis and the adjacent districts. From the wool of this sheep, mixed with imported Spanish wool, are manufactured those beautiful skull-caps common in the Levant, worn by the Greek sailors and those of Barbary, and by the lower classes more especially on both sides of the eastern portion of the Mediterranean. Tunis was formerly the only place where the manufacture of these caps was carried on; and it is stated that throughout the regency more than 50,000 persons were employed; but since similar articles have been manufactured at Leghorn and Marseille, the number has greatly diminished. Still, however, the Tunisian caps are by far the most valuable, being superior alike in brilliancy of colour and firmness of texture. The manufacture of these caps is described by MacGill in his account of Tunis, and as the process is curious, a brief *resumé* of the details may not be uninteresting. The wool, composed as we have said of native Tunisian and Spanish (the proportion of the latter increasing according to the fineness of the intended article), is duly combed and spun into a fine thread; it is then knit, sometimes woven, into caps of a conical form, like a night-cap. These caps are soaked in oil, and are then milled on a form placed on the knee of the workman, by rubbing the sides together and frequent turning, till they are reduced to about one-half of their original size. When the cap is sufficiently thickened it is brushed with the bur of a kind of thistle in order to bring up the nap, and the fibres

which exceed the rest in length are cut off with a pair of shears. The caps thus milled, napped, and sheared, are in the form of a semi-globe. In this state they are sent to Zawan, about thirty miles from Tunis, in order to be dyed of a deep crimson colour. The water at this place is supposed to possess the quality of giving a peculiar richness and permanence to the dye. This part of the process being accomplished, the caps are returned to the manufacturer, in order to be finished off; they are subjected to another milling, and are dressed and clipped with the greatest care, till the surface assumes the appearance of the richest velvet. A neat tassel of mazarine blue silk thread is sewed to the top, and the cap is completed and ready for the market.

It would appear from the statements of the same writer that the wool-growers of Barbary are by no means remarkable for their honesty, and take various methods of fraudulently adding to the weight of the fleeces they sell, which are afterwards further adulterated by the wholesale merchant. The wool, he observes, in different parts of the regency (of Tunis) is of various kinds and qualities; but the greatest difference results from the quantity of dust and sand that are mixed with it, in order to increase its weight, each district having its own method of thus adulterating it. In one part of the country the shepherds, a little before sheep-shearing, hunt their flocks upon the sand till they are in a high state of perspiration, when the sand flying in clouds mixes with the wool and adheres to it. This is repeated for several days, until sometimes a greater weight of sand is driven into the fleece than that of the pure fleece itself, and consequently the loss on washing is very great—in some places from fifty to fifty-five per cent; in the neighbourhood of Tunis about forty per cent.

The time for buying wool is during the month of June, when the Arabs bring it to market. The price is somewhat higher if it be bought of them in the small quantities that each brings, than if it be bought wholesale from the wool-merchant; but the first is the best and cheapest method, for not only do the merchants take out the wool of finest quality, but they mix mire, sand, and filth with the residue in order to increase its weight.—*Punica fides!*

It were useless to inquire what the characters of the sheep were throughout Northern Africa in ancient days, when Carthage flourished the rival of Rome, and noble cities and towns attested the power, opulence, and civilization of the Phœnicians. Doubtless the sheep was then cultivated, and produced splendid wool for the Tyrian dye; and the same observation will apply to the sheep of Syria and the proximate parts of Western Asia. It is easy to conceive that from various causes the sheep of these countries have degenerated, for

the sheep is the creature of cultivation; it is made what it is by art, and requires the persistence of art to keep it up in what we call its perfection. But when wars desolate a country, when a nation declines, the arts of civilized life languish, and the cultivation of the land and the rearing of flocks and herds become neglected; then will the sheep degenerate, nor will its restoration be again very rapidly effected. No one can read of the dyed curtains and raiments so often alluded to in the Scriptures without feeling assured that the sheep of early times was valuable for its fine wool. Homer depicts his heroes as clad in rich vestments of purple; and the classic allusions to the art of embroidery in wool, and the weaving of exquisite tissues, lead us to infer that the material used was of first-rate quality. The expense indeed of the purple dye of Tyre was so great, that to have used it upon coarse material would have been folly; nor indeed would the fabrics thus stained have acquired the praises of all writers, and those too of countries where refinement in the splendour of life was carried to the utmost bounds—countries where ivory and gold were lavished in the decoration of apartments, and where wealth could purchase all that might administer to pomp and luxury. It is in fact rather from a general description of the woollen fabrics of antiquity, and a statement of the value put upon some of the finest texture, than from any definite account of the principal breeds of sheep, that we come almost unavoidably to the conclusion that races, not only in Greece and Italy, but in North Africa and Phœnicia, were wool-bearers of superior excellence.

There is an admirable article on dyeing in the *Penny Cyclopædia*, a passage from which relative to the dyed wools of Tyre is worthy of our especial attention, inasmuch as it will serve to show that no inferior wool would have been worth the cost of dyeing, which was at all times enormous. "Tyre," says the able writer, "was the nation of antiquity which made dyeing its chief occupation, and the staple of its commerce. There is little doubt that purple, the sacred symbol of royal and sacerdotal dignity, was a colour discovered in that city, and that it contributed to its opulence and grandeur. Homer marks the antiquity as well as value of this dye, by describing his heroes as arrayed in purple robes. Purple habits are mentioned among the presents made to Gideon by the Israelites, from the spoils of the kings of Midian.

"The juice employed for communicating this dye was obtained from two different kinds of shell-fish, described by Pliny under the names of *purpura* and *buccinum*, and was extracted from a small vessel or sac in their throats, to the amount of only one drop from each animal. A darker and inferior colour was also procured by crushing the

whole substance of the *buccinum*. A certain quantity of the juice collected from a vast number of the shells was treated with sea-water, and allowed to ripen for three or four days; after which it was diluted with five times its bulk of water, kept at a moderate heat for six days more, occasionally skimmed to separate the animal membranes, and when thus clarified was applied directly as a dye to white wool, previously prepared for this purpose by the action of lime-water, or of a species of lichen called *fucus*. Two operations were necessary to communicate the finest Tyrian purple; the first consisted in plunging the wool into the juice of the *purpura*, the second into that of the *buccinum*. Fifty drachms of wool required one hundred of the former liquor, and two hundred of the latter. Sometimes a preliminary tint was given with *coccus*, the *kermes* of the present day, and the cloth merely received a finish of the precious animal juice. The colours, though probably not nearly so brilliant as those producible by our cochineal, seem to have been very durable, for Plutarch says, in his *Life of Alexander* (c. 36), that the Greeks found in the treasury of the King of Persia a large quantity of purple cloth which was as beautiful as at first, though it was one hundred and ninety years old. The difficulty of collecting the purple juice, and the tedious complication of the dyeing process, made the purple wool of Tyre so expensive at Rome, that in the time of Augustus a pound of it cost nearly £30 of our money. Notwithstanding this enormous price such was the wealth accumulated in that capital that many of its leading citizens decorated themselves in purple attire, till the emperors arrogated to themselves the privilege of wearing purple, and prohibited its use to every other person. This prohibition operated so much to discourage this curious art, as eventually to occasion its extinction, first in the Western and then in the Eastern Empire, where however it existed in certain imperial manufactories till the eleventh century."

Into further details respecting the ancient Tyrian dye we shall not enter; our object in referring to it is to show that the wool placed in the hands of the Tyrian dyers must have been worth the great expense attending the process. That the wool of the ancient Carthaginians (themselves of Tyrian origin) was dyed either at Tyre or according to the Tyrian mode cannot be doubted; nor that throughout the East of Europe, and Western Asia, purple cloth was an important article of commerce. Ezekiel in the *Lamentation for Tyrus* says, "Syria was thy merchant, by reason of the multitude of the wares of thy making; they occupied in thy fairs with emeralds, purple, and brodered work, and fine linen, and coral, and agate" (ch. xxvii., ver. 16). And farther, "Arabia and all the princes of Kedar they

occupied with thee, in lambs, and rams, and goats; in these were they thy merchants" (ver. 21). Of some other nations it is written, "These were thy merchants in all sorts of things, in blue clothes, and brodered work, and in chests of rich apparel, bound with cords, and made with cedar, among thy merchandize" (ver. 24). In these quotations we have distinct allusion not only to the dyed cloth but to the fine-woolled sheep brought as merchandize to Tyre, and from the produce of which the cloth was manufactured. It was however not only at Tyre that an expensive process of dyeing was anciently carried on; in the same book we find, that not only fine linen from Egypt, "but blue and purple (or rather purple and scarlet) from the Isles of Elishah," that is woollen fabrics of these colours, were imported into Tyre. By the Isles of Elishah is meant the Peloponnesus. "Elishah," says Dr. Kitto, "was one of the sons of Javan, and as Javan is the general title for the Greek nation, Elishah may well be taken for a part, and that part Elis, Hellas, or Peloponnesus. It seems odd that the Tyrians who were so famous for their purples should have required this from Elishah, but the purple of Laconia was the finest dye next to the Tyrian, and the purple cloth of that province was possibly employed because it was cheaper than that of Tyre, which was reserved for the use of kings. It seems to have been employed as coverings or awnings to the galleys, which were sometimes very magnificent. Our readers will remember that the famous galley in which Cleopatra went to meet Anthony had an awning of cloth of gold." In the time of Horace the Laconian dye was celebrated:—

"Nec Laconicas mihi
Trahunt honestæ purpuras clientæ." *
CARMEN, Lib. ii. Ode 18.

At Thyatira, a city of Lydia, in Asia Minor, the trade of dyeing purple was extensively carried on. Among the ruins of that city an inscription has been found, which was originally made by the corporation of dyers in honour of Antonius Claudius Alphenus, a distinguished man in the reign of Caracalla. It may be remembered that at Philippi Paul met "a certain woman named Lydia, a seller of purple, of the city of Thyatira" (*Acts*, xvi. 14).

Reverting more particularly to the ancient sheep of Northern Africa, it may be observed that Columella (uncle to the writer of the same name on agriculture), who lived near Cadiz during the time of the Emperor Claudius, saw certain African sheep destined for exhibition in the Roman amphitheatre; some of these he obtained by purchase, and crossed his Spanish ewes with them. The mixed breed are stated to have resembled the

* Not for me Laconian purple high-born ladies spin.

sire in their improved size and in beauty and figure, and the dam in the softness of the wool. In later times Pedro the Fourth of Spain imported several rams from Barbary with a view to the improvement of the Spanish sheep, and at a still more recent period Cardinal Ximenes (in the beginning of the sixteenth century) had recourse to rams imported from Africa for the same purpose. Colonel Hamilton Smith notices a breed of sheep in Morocco with long wool and small ears and horns; their colour is generally white with marks of liver-brown. A specimen sent from one of the princes of Morocco is said to have lived for some time in the possession of the late Sir Joseph Banks. Of this breed we have no personal knowledge. Probably it may be the relic of a valuable stock once more extensively spread, and perhaps even imported by the Moors into Spain during the period of their occupation of so large a portion of the country. As however we shall hereafter have occasion to speak more at large respecting the Spanish sheep, we shall here add nothing respecting their presumed origin. Of this we are sure, that the woollen manufacturers of Seville, Murcia, and Granada, arrived at a high degree of perfection under the Saracenic dominion; and that after the expulsion of the Saracens, the trade in fine clothes and in wool of exquisite quality was reduced to the lowest ebb.

It is time however that we turn to some of the more remarkable breeds of Europe, and leave the sheep of Asia and Africa, respecting which our information is extremely limited. From the early civilization of Greece, and from the frequent allusions to sheep and shepherds by the ancient classic writers of that country, we may naturally infer that the ancient breeds of sheep were of considerable value. But when we consider the revolutions and spoliation which Greece has undergone since the time in which the triumphant crescent glittered on the dome of St. Sophia, and the Byzantine empire yielded to the Ottoman power; when we reflect upon the temples of Greece destroyed, the cities ruined, the fields laid waste, the interruption of the peaceful employments of life, and among these of the rearing of flocks, and the culture of land, we shall not be surprised to find that the sheep of Greece have degenerated from their pristine excellence. There are indeed numerous herds of sheep and goats which migrate to the mountains in the spring and return to the lowlands after harvest, and the produce of the wool is considerable, but it is generally speaking of coarse quality and is used chiefly for home manufacture. In Arcadia, where once the tuneful shepherds led their flocks, and where the practice of leading the sheep and giving them names still prevails, a breed exists possessing many good points, and capable of further improvement. The

wool of these sheep is thick, soft, and much curled; the general form is good, the back is broad, the chest developed, the limbs small, and the countenance lively, the head however is large. These sheep average from ten to twelve pounds the quarter.

Sheep form an important part of the wealth of the Greeks, especially in the mountain districts, but are not well managed; the flocks are under the care of shepherds, but no provision of food is made for them during the winter; they are merely led from pasturage to pasturage as circumstances may admit. The only milk used is that of goats and sheep; both butter and cheese are made to a considerable extent, and from these articles and from the lambs the chief profit accrues. The lambing season extends from December to the end of January, and the lambs are allowed to suck till the end of March; they then sell at from three shillings and sixpence to five shillings each of our money—and as, during Easter, there is a great consumption of lambs among the followers of the Greek church, they find a ready market. During the months of April, May, and June, the ewes are milked twice a day, and afterwards only once a day; each ewe is calculated to yield on an average nearly a pint of milk at each time; and from this, first butter and then cheese is extracted. The mode of extracting the butter is very simple, the milk is allowed to stand for twenty-four hours, until it becomes sour, when it is briskly agitated until the butter separates and floats. To the buttermilk, after the removal of the butter, an equal proportion of fresh milk is added; and from this cheese is produced. The mixture is boiled, and curdled by a preparation of lime-juice or lemon juice mixed with flour and water that has been suffered to become sour, to which boiling milk is added. After the removal of the first curd, a little more fresh milk is added to the whey, and after a short boiling a second coagulum is formed. Sometimes cheese is prepared from fresh milk exclusively, the acidulous preparation being poured into it after boiling, when it has cooled sufficiently to allow the hand to be dipped in without scalding. The latter cheese is of a superior quality, compared at least with the ordinary cheese of the country. This method of cheese-making is of early antiquity, and reminds us of the description of Polyphemus in his cave by Homer.

In the Island of Cyprus considerable numbers of fat-tailed sheep are kept; these are coarse woolled, and vary in colour, and the wool is capable of being used only in the manufacture of inferior or coarse goods. Many of the sheep of Cyprus have four horns; of these the two central are frequently erect, or slightly diverging, but the outermost on each side is twisted into various forms, often very irregularly.

The wool of ancient Attica is described as

having been of very fine texture, and the sheep in many parts of Greece had their fleece defended from the dirt and sand by a sort of garment or covering of skin. With regard to the fineness of the wool, the sheep of modern Greece have degenerated from their ancestors, and we cannot learn that the practice of defending the fleece is there adopted. The sheep are generally sheared towards the latter part of April or in May, without being previously washed: about three pounds of wool are obtained from each ewe, and four pounds from each ram, valued at less than fivepence per pound. It is used for carpeting and coarse articles. The skin of the sheep, unshorn, is worth from fifteen to twenty pence, and when converted into leather finds a ready sale, especially in the islands of the Greek Archipelago, where few sheep are kept: these islands, indeed, are dependent on the mainland for the supply of wool, hides, leather, and mutton. There are goats, and the flesh of the goat, and especially of the kid, is much esteemed, but "beef is rare within these ox-less isles," and some are so barren and rocky that a few goats only are capable of finding pasturage upon them.

Southern Russia exports a great quantity of valuable wool. In 1837 the quantity imported from Russia into the United Kingdom amounted to 6,114,945 lbs. The greater portion of this is shipped at Odessa, and is the produce of flocks fed in the Crimea, on the banks of the Dnieper, in many districts of the Ukraine, and also on the banks of the Don, and various other parts of the country, where the Cossack and other tribes are rich in the possession of sheep. The breeds are very various. In the Crimea there are immense flocks of coarse-woolled sheep, with fat tails, the wool of which is white, black, or gray. To these sheep the Tartars pay more attention than to their cattle, and indeed pride themselves on their management of flocks. They give salt to their sheep in great quantities, driving them in the spring of the year to hills where the vegetation is of a saline nature, and also during the summer season giving them two or three times a week prepared salt to eat by way of a relish. In winter those which are left out upon the exposed bleak steppe are in frequent danger from the drifting of the snow, the more especially as they are apt to run before the wind in snow-storms, and become lost in the hollows and pits of the steppe. In order to prevent such accidents the Tartars usually mix a number of goats with the flock, who are said to lead the sheep on these occasions, and turn them from danger. Even at this season of the year the sheep are driven to salt water twice a week.

The flesh of the lambs fed on the hills near the sea-coast is said to be delicious, but that of the full-grown sheep is coarse. Their wool is of

inferior quality, being much mingled with hair. It is sheared in a curious manner:—Having tied the legs of the animals as if they were about to kill them, the Tartars sit down cross-legged on the ground, and pulling the sheep between their knees begin the operation. The shears are most awkward instruments, like large scissors, or two huge knives rivetted together, and though, as may be supposed, no boast can be made of the neatness with which the work is done, yet even with these rude instruments it is accomplished very expeditiously. It is not from this breed that the delicate gray lambskins of the Crimea, which are so celebrated, are obtained, but from certain flocks at the two extremities of the peninsula, about Kertch on one side and Kosloff on the other. They are bought up by merchants, and sent to Moscow and other places in the interior of Russia.

A rich Tartar will frequently possess 50,000 sheep, of which the wool is more or less valuable. In the mountains there is a breed of sheep, inferior in size to those of the plains, but noted for the fineness of the wool. Of late years, owing to the importation of Merinos, this mountain breed, and indeed the breeds of the plains, have decidedly improved. The object of the introduction of the Merinos was not so much their cultivation in a state of purity, as the establishment, by their intermixture with the native sheep, of stocks valuable for their wool, and the experiment has been successful. For some years past the wool exported from Odessa has yearly increased in quality and quantity. It is usually very clean and white, and some of the best samples are nearly equal to English Merino. The fibre is soft, with numerous curves, and varies from four to six inches in length. Its diameter, beneath the microscope, and viewed as a transparent object, was found by Mr. Youatt to be $\frac{1}{750}$ th of an inch, being the same as that of Lord Western's Merino wool, and its serrations were 2,080 to an inch, those on the Merino referred to being 2,400, and those in Saxony wool 2,720.

Throughout the whole of the South of Russia vast flocks of sheep are kept by the Cossacks and wandering pastoral tribes, who live in a state of barbaric simplicity, and make long journeys to Moscow and even St. Petersburg with extensive droves, both of these and of horned cattle. The flocks are attended each by one or two men, who convey their baggage, provisions, and cooking utensils in a waggon drawn by two oxen. They travel during the night, and allow their flocks to repose and feed along the sides of the road during the day; while stretched at ease, under the shade of the birch tree, they pass their time in a true Scythian state, occupying themselves in cooking and preparing for their own wants. As evening comes on they are ready to start again on the journey, which often occupies three months, the dis-

tance travelled each night being from eight to sixteen miles.

In the more central parts of Russia in Europe the sheep are of inferior breeds, and have coarse wool much intermixed with hair; but in the neighbourhood of the Baltic superior breeds are cultivated, those of the islands of Dago and Oessel, bounding the Gulf of Riga on the north, are noted for their excellent wool.

The following picture of the sheep and shepherds of Southern Russia (our authorities being Kohl and Tooke) may not be uninteresting. It is well known that many of the Russian nobles derive a considerable portion of their revenue from their herds of horses; but their sheep are a still greater source of riches, a fact intimated by the circumstance that when the wealth of a noble is mentioned it is often estimated by the number of sheep which he possesses; some individuals are said to possess no fewer than a hundred thousand sheep. These sheep are mostly of the ordinary Wallachian breed (not the spiral horned variety), noted for the huge size of the tail, which is somewhat heart-shaped, and consists of a mass of fat; besides these, there is the Kalmuc variety, which carries a load of fat on each side of the croup, so as to hide the short tail: some flocks of Merinos are also to be seen, and their cultivation is not destitute of success.

The keeper of a large flock of sheep is called *tschabawn*. He is a much more quiet and peaceable being than the *tabuntschik*, who looks after the herds of horses. As the former is not obliged to range over so wide an extent of country as the latter, he is able to carry about with him many comforts which the latter cannot hope to obtain. The *tschabawn* has usually one or two waggons drawn by oxen, in which he carries with him his provisions and cooking utensils, together with the skins of sheep that die, and those of the wolves which he has been fortunate enough to kill.

The plains of Russia increase year after year in the number of sheep reared on them. In this respect they resemble those of Australia; but the Russian sheep are exposed to much more severe privations than those of Australia. The scorching heats of summer, and the piercing blasts of winter, are alike tremendous to them; while the storms and hurricanes which occasionally burst over the plains are nearly as bad as either. During these hurricanes the poor animals make not the least attempt to resist the violence of the storm, but run away in a perfect panic before the wind, and are forced by thousands into the streams and ravines by which the steppes are intersected. Neither the shepherds nor their dogs are of much value at these times, but goats render very valuable services. With every hundred sheep three or four goats are invariably associated. The sheep

alone could never be brought to face the terrible winds of the plain, or to march into a ravine; but the goats are easily brought to face any wind that will bear facing, they lead the way boldly down the most rugged descents, and the sheep then follow those leaders without much apprehension.

The flocks of sheep, which are called *ottara*, are placed under some sort of shelter during the winter months; but this shelter is so miserably insufficient, and the food so scanty, that the poor animals become worn to skeletons by the time spring arrives. The summer months are passed in the open plains, and the movements of the whole herd form a picturesque sight. The *tschabawn* selects his resting-spot according as it furnishes grass and water for his sheep. If he comes to a fine pasture ground, he seldom leaves it till the grass has been eaten away; and, even when on the march, his encampment for the night is often only two or three miles from the spot whence he started in the morning. The order of progress is tolerably uniform and simple: the *tschabawn's* baggage waggon usually leads the van, the *tschabawn* follows it, and the sheep follow him. The sheep, it is said, are "no early risers, and love not to have their morning meditations interrupted till the night dew has dried away, and fitted the grass for their enjoyment. The taste of the sheep is the very reverse of that of the horse. The latter never enjoys his meal more than at night; while the former likes to keep good hours, and seldom stirs from his bed till morning, but passes the witching hours by a careful repetition of the last day's studies in the silence of rumination."

So long as the weather is mild and enemies are absent, the proceedings of a *tschabawn* and his flock are tolerably comfortable. But this state of things is seldom of long continuance. Wolves are very numerous on the steppes, and it requires all the vigilance of the keeper to preserve his flock from their voracious attacks; but, on the other hand, as the skin of a wolf is always a valuable prize, the shepherd is not often ill-disposed to meet with such an enemy. A snow-storm, however, is an opponent of a very different kind, and is often productive of most distressing results. When Kohl the German traveller was in these regions a few years ago, an old Russian *tschabawn* gave him the following account of a snow-storm to which he and his flock had been once exposed.

"We were once grazing the *ottara* of a rich Bulgarian. It is in the steppe of Otshakoff, and there were seven of us, with two thousand sheep and a hundred and fifty goats. The month was March, and we had just driven out for the first time. The weather seemed mild, and there was some grass already on the ground, so that we deemed of no mishap. In the evening it began to rain, and the

wind was bitter cold. Soon the rain turned to snow, and our wet cloaks were frozen as hard as boards. A few hours after sunset we had a regular Siberian *vyuga* (snow-drift) from the north-east whistling about our ears, till seeing and hearing became equally impossible. We had not got far from home yet, so we tried to find our way back, but it was impossible to make the sheep face the wind; and even the goats, who will face anything but a *vyuga*, were beginning to run before the storm. To keep the flock from scampering away was impossible; all we could attempt was at least to keep them together. In this way we had to race it all night, and in the morning nothing but snow was to be seen around us. The *vyuga* raged all that day, and the poor sheep were even more wild and frightened than during the night. Sometimes we gave up all as lost, but then we roused ourselves again, and ran with the screaming bleating flock, while the oxen trotted after with the waggon, and the dogs came howling behind. The very first day, on which we ran at least fifty or poor goats were all lost or frozen to death the sixty versts (a verst is about three-fourths of an English mile), leaving a track of dead sheep behind us the whole way. In the evening the poor beasts ran less wildly, for they were fairly exhausted with hunger and fatigue. We were also knocked up. Two of our party reported themselves sick, and crept under the mats and skins in the waggon, while the rest of us had only time to take a little bread and snow to sustain life. Night came on, but no house or home was anywhere to be seen, for the Otshakoff steppe is one of the wildest countries in the world. That night was worse than the first, and as we knew the storm was driving us right upon the coast, we expected every moment to be blown, with all our stupid flock, into the sea. Another of our men fell sick, so we packed him in the waggon along with the rest. We all thought that night would have been our last. Towards morning the wind fortunately shifted about, and drove us towards some houses, that we were able to distinguish through the drifting snow; but though they were not more than thirty feet from us, it was impossible to make the foolish sheep turn aside. On they went, right before the wind, in spite of all that we could do; and we soon lost sight of the houses; but the good people had heard the howling of our dogs, and guessed what was the matter. They were German colonists, and some fifteen or twenty of them came to our help, and then we managed to stop the sheep, and drive them under the sheds, and in the houses. We had lost all our goats, and about five hundred of our sheep, but many of the poor things died after we got them under shelter, for in their fright they kept so close that many of them were smothered. We thanked God

and the good Germans for our safety, for half a verst farther we should have come to the coast, rising twenty fathoms high above the sea. The Germans did all they could to make us and our sick men comfortable; but some of us were a long time before we recovered from the effects of that bout."

The scene thus depicted is one of the most gloomy to which the *tshabawn* and his flock are exposed. In fine weather the proceedings are much more pleasant. When the shepherd comes to a piece of good grazing ground he pitches his camp, and avails himself of all the little comforts which his baggage waggon affords. His little kitchen is immediately put into order; one kettle is appropriated to boil food for himself and his men, while another is appropriated to the dogs, kept principally as a means of repelling the wolves. While one of the party acts as cook, another has perhaps been stripping the skin from off a dead sheep, and another has been attending to the sick members of the flock, while several others employ themselves in milking—for there are often five or six hundred sheep in one flock in milk. The milk thus collected is placed in wooden vessels, exposed to the sun, and converted into a kind of cheese, known by the name of *brinse*. This cheese, as soon as the whey has been drained off, is packed in goat skins, with the fur turned inside. The skin gives it a peculiar flavour; but this is one of its chief recommendations to the dwellers on the Russian plains.

When the evening meal is done, if the weather be fine, the men and dogs stretch themselves out for an hour or two before a blazing fire of dry reeds and grass, the shepherds discussing such subjects as their monotonous life may afford. The arrangements for the night are then made: the waggon is the lodging of the principal *tshabawn*, who there entertains any straggling guests he may have; for a kind of rude hospitality is shown towards any strangers whom chance or misfortune have made wanderers in those parts. The other *tshabawns* drive the sheep together as closely as possible, and then form with their dogs a complete circle round the flock. Each man throws his furs, that serve him for mattress and coverlet, on the spot assigned him, and between every two beds the same measured interval occurs. The next thing is to make the beds for the dogs. This is soon done. There are as many rugs provided as there are dogs, and as each dog from custom knows his own rug, all that is necessary is to lay the rug on the spot where it is wished the dog should take up his station for the night. Thus, what with the men and the dogs, a complete *cordon* or circle of defenders surrounds the flock of sheep. A camp thus fortified is generally pretty safe against the wolf; still there are few nights pass away without an alarm, for the wolves will hover for many

successive days and nights around the flock, in the hope of espying sooner or later an unguarded point, or of taking advantage of a panic into which the flock is sometimes thrown by a sudden storm.

We have already alluded to that variety called the Cretan or Wallachian, remarkable for its curious spiral horns, and its outer clothing of fine long falling hair concealing an under garment of wool. This wool is excellent, being $\frac{1}{50}$ th of an inch in diameter, and having 2,080 serrations to the inch, but it is not very much curled. This breed in its pure state is not now very common; formerly it spread from Wallachia through Hungary and Bohemia, and its skin, dressed with the pelt on it, was made up into mantles or cloaks much used by the peasantry, inasmuch as it was a sure defence against the most bitter storms, and, on an emergency, proved a garment wrapped up in which the shepherd might bivouac on the snow even in the depth of winter. The skins of the lambs, unshorn, were of considerable value, and were converted into various articles of dress, esteemed both for their warmth and the beauty of the fur. Of late years the Merino race has been introduced into the countries above-mentioned, and has either superseded or greatly modified the old breed. The same observations apply to Moldavia and Moravia, where a closely allied breed of sheep has given way to the Merino. With regard to the sheep of Norway, little is to be said; cattle and goats are numerous, but few sheep, comparatively speaking, are reared, and these are not of much value as far as the wool or the flesh is concerned. They are gaunt and long-legged, with coarse wool, and are ill-fed during the winter; during the summer the flocks suffer exceedingly from the attacks of myriads of mosquitoes, and this the more so as they are shorn twice or thrice in the course of the season, a practice which cannot be too much condemned, inasmuch as it not only tends to deteriorate the quality of the fleece, but also to debilitate the animal, and render it both constitutionally, and as far as its natural garment is concerned, less fitted to endure the severities of a Norwegian winter. Coarse woollen cloths are made by the country people for home consumption, and a small quantity of wool is exported. Mr. McCulloch, in his statistical tables, gives the amount imported from Norway into Great Britain as 520 lbs., a mere trifle. On the other hand, he gives the exports of manufactured woollen goods to Norway in the same year, as follows:—Cloths of all sorts, 457 pieces; Napped coatings, &c., 28 pieces; Kerseys, 123 pieces; Baizes, 34 pieces, Woollen or Worsted stuffs, 2,689 pieces; Flannel, 3,203 yards; Blankets, 1,122 yards; Carpeting, 48 yards; Woollens mixed with Cotton, 800 yards; Hosiery, as Stockings, &c., 153 dozen pairs; other Hosiery, as Rugs, Coverlids, &c., at value declared, £146.

Total declared value, £10,648. Though this commercial estimate appears but small, let it be remembered that the population of Norway, for we are speaking now of Norway exclusively, amounts only to about 1,160,000 souls; of which only 124,920 live in towns, the remainder being dispersed in villages, hamlets, or solitary houses over the country; and that of these, one-half at least are employed in the fisheries, in preparing the produce of the forests for the market, and in the mines. That 48 yards of carpeting was the amount in this article of our exports to Norway for the year 1837 need not therefore surprise us. Let us not forget that furs and eider down are the produce of Norway, and that with these, and timber, tar, fish, copper, and cobalt, the frugal and hardy Norwegians load their vessels for the supply of other countries, albeit they cannot "boast their sheep," and can scarcely be called a manufacturing people.

In Denmark, on the contrary, great attention is paid to the sheep, and the Merino breed is sedulously cultivated. This breed was introduced about sixty years ago, and has greatly modified the old races, though it has, perhaps, not altogether superseded them. The old breeds much resembled those of Norway, but produced better wool, some of them, in the southern districts, even fine wool, though not in great quantity. These sheep afforded material for improvement, and the Danish government commenced the good work by the purchase of 300 Merinos of the finest breed, which were placed on a farm at Esserum, near Copenhagen, and most carefully superintended. The result may be inferred from the fact, that in 1837 the quantity of wool imported from Denmark into the United Kingdom amounted to 516,227 lbs., exclusive of what was sent elsewhere. On the other hand, the total value of our exports of woollen goods into Denmark, during the same year, amounted only to £2,042. We may, therefore, set down Denmark as a wool-growing country.

From Denmark let us pass to Iceland, (or as it is in the native language, Island.) In this land of snow, geysers, and volcanic mountains, we cannot expect that farming can be carried on with any degree of perfection. Nevertheless considerable attention is paid to the rearing of cattle. In 1804 the number of farms on the island were estimated at 4,751 with 20,325 head of horned cattle, 26,254 horses, and 218,818 sheep. The great harvest is hay, little corn being now cultivated; and the common food of the people is butter, milk, and fish; the Iceland moss is also much used as an article of diet; fresh meat and rye bread are holiday fare. The exports from Iceland consist of dried cod and other fish, whale oil, salted mutton, eider down, and sulphur.

The Iceland sheep, of which specimens have at different times come under our personal observation, are of tolerably large size and strongly built; their fleece consists of coarse hair externally with an under layer of close wool; the horns are generally four in number, sometimes six or even eight, and this is the more remarkable as the cows and oxen are mostly polled.

Many are the casualties to which the sheep of Iceland are exposed in their dreary country; they have to endure the storms of winter; they are exposed to the rushing descent of terrible avalanches, and to the overwhelming force of volcanic eruptions, to say nothing of the destruction of lambs by eagles, and occasionally by polar bears, drifted from Greenland on vast masses of floating ice. In the year 1755 an eruption from the volcano of Katlegia near the east coast destroyed fifty farms. In the year 1783 a still more terrible eruption from the Skeidara and other volcanoes of the Klofa Jökul ridge covered several fertile districts with lava; the ashes and the effluvia corrupted the water and the atmosphere all around; the fish were driven away from that part of the coast, and famine and pestilence followed, which in two years carried off 9,000 people, and destroyed thousands of horses and cattle, both oxen and sheep.

To the Icelander the sheep is a most important animal: from its milk both cheese and butter are obtained; its flesh, when dried or salted, forms an article both for home consumption and for exportation; its wool enters into the material of almost every part of the Icelandic dress; of the skin fishing garments are made, and these, being smeared repeatedly with oil, so as to become saturated with it, are rendered quite water-proof. The tenant of a farm pays his rent partly in wool and tallow. When butter is rare, sheep's tallow is the general substitute; and so fond of this substance are the children, that they may be seen eating lumps of it as if it were some sort of sweatmeat. One of the ways in which these primitive and hardy people reward their parish priests, is by keeping each of them a lamb for him during the severe winter season; they take it under their care in October, and return it to the minister in good condition about the middle of May.

In Iceland as in the Eastern parts of the world a sheep or lamb is the usual tribute of hospitality, and is the common present to the stranger and traveller, or killed to make him welcome.

We must not suppose that no attempts have been made to improve the sheep of Iceland. As early as the year 1756 Spanish rams were introduced, but without any decided advantage, owing chiefly to the negligence of the islanders. In 1808 a spirited individual made a more decided attempt at improvement, and introduced a few Merino sheep from Norway with considerable

success. Sir George Stewart Mackenzie, when in Iceland in 1809—10, saw the first cross between the Merinos and the native sheep, which he says promised well. We cannot learn to what extent further improvement has proceeded.

During the summer the sheep in Iceland pasture upon the mountains, but on the approach of winter they are gathered together and driven into the valleys, where they are collected in large pens or inclosures, when the losses from various casualties which the different proprietors have suffered are easily discovered. After the hay-harvest is over, when the parish officer has ascertained that the farmers are ready, he communicates with the sysselman or magistrate of the district, who causes a notice to be proclaimed in the churches that on such a day the gathering of the sheep will commence, and at the same time appoints a place of general meeting. Every farmer who has a considerable stock feeding on the highlands must send one man; but if the number of his sheep be small, he may for mutual convenience join with another whose case is like his own, and send one man to act for himself and his friend. When the men appointed for this service meet, they choose from among their number a shepherd who has had much experience, whom they agree to obey, giving him the title of *king*, with the power of electing two associates as his counsellors.

The sheep-gatherers accompanied by children set off on horseback in very large parties, and contrive all to be on the appointed day at the spot selected, near to the mountains. There they pitch their tents, and committing their horses to the care of the children they await the orders of their leader or king, who, still on horseback, sends them off two by two, with necessary directions, and a strict injunction not to lose sight of their comrades. When these men have collected as many sheep as they can find, they drive them towards the tents and then shift the scene of their operations. In this manner they proceed during a whole week, the sheep as they are collected day after day being placed in an immense pen or fold, of which there are many in different parts of the country appropriated to this purpose. Afterwards the sheep of the different farmers are separated into smaller inclosures; and while this work is proceeding the people hold a sort of rural festival, the gaiety of which however is often interrupted by the lamentations of such as have incurred serious losses in their flocks. Those who now fail in recovering all their sheep renew their search at the middle and again at the end of October, if the season be sufficiently clement. We learn from Mr. Henderson that every Icelandic farmer has a particular mark on the ears of his sheep, and is thus enabled to identify them. The bleating of

the numerous flocks, the noise made by the peasants in proving their property, and the appearance of the pens and tents which crowd the valley, give at these times a very lively aspect to the desert tract, and furnish a temporary relief to the silent monotony of Icelandic life. These pens are stated to be all built of lava erupted by the volcanoes of the island.

During the winter the care of the cattle and the sheep devolves entirely on the men, and consists chiefly in feeding and watering the former, which are kept in the house, while the latter are turned out in the day-time to seek their food through the snow. When the snow happens to be so deep that they cannot scrape it away themselves the boys do it for them, and as the sustenance procured is exceedingly scanty they generally get a little of the meadow hay about this time. The farm hay is given to the cows alone. All the horses, excepting perhaps a favourite riding horse, are left to shift for themselves the whole winter, during which season they never lie down, but rest themselves by standing in some place of shelter.

At this season an important occupation of the Icelandic women is to pick, clean, and spin the wool; the interior of their huts is seldom seen without a sheepskin or two, destined to make fishing dresses for their husbands. These skins are prepared by being soaked in water till the wool loosens; they are then further cured and saturated

with oil. According to Van Troil the sheep in Iceland are very apt to hide themselves during bad weather in caves. If no such retreat is near, when a snow-storm comes on they place themselves all in a heap with their noses towards the centre and bent to the ground, which not only prevents them from being so easily buried, but facilitates the owners finding them again. In this situation they can remain for several days, but instances are not unfrequent in which they are induced by hunger to gnaw off each others' wool. Kerguelin asserts that when sheep have been once driven to this direful extremity they will afterwards, even when not pressed by want of food, nibble each others' fleece, as if they were under some delusion, or had acquired a morbid propensity to feed on this unnatural substance, which becomes at last inveterate, so that the farmer is compelled to destroy them.

There are no wolves in Iceland, but foxes exist, which are often a source of annoyance from the havoc they commit among the lambs; the sheep however know how to unite in self-defence, and are said to show considerable intelligence and some degree of courage in repelling the assaults of the enemy. The polar bear, as we have said, is sometimes drifted ashore on icebergs, and commits great ravages, but is generally soon dispatched, the country being roused and every means to get rid of the mischief being put into requisition.

CHAPTER IV.

ON THE VALUE AND DIFFUSION OF THE MERINO BREED.

WE have several times had occasion to mention the Merino sheep as a source of the improvement of the breeds of various countries; and as we shall have, hereafter, frequent occasion to advert to them, it will be as well, before proceeding further, to give some account of them, and of their extension into so many parts of the globe where the cultivation of the sheep for the sake of its wool has been diligently and successfully pursued. Spain, from the earliest ages, has been celebrated for the production of wool of exquisite delicacy; and though, from the time when it was a Roman province to the present day, the country has undergone many changes, many revolutions, certain breeds of sheep have continued to maintain their ground, and at the same time their pristine celebrity. Various were the colours of the ancient breeds; there was a black race the wool of which was remarkably fine, but was exceeded by the red or erythræan wool of the breed of Bœtica, now including Andalusia and Granada. Strabo, in the reign of

Tiberius, speaks of the beautiful woollen cloths made of Spanish wool, and worn by the Romans; and at a subsequent period, Columella, who resided in Bœtica in the reign of Claudius, exerted himself in the improvement of the Spanish sheep by the introduction of rams from Africa, and also of the more valuable stocks of ancient Italy. The anonymous writer of a pamphlet 'On the Name, Origin, and Breed of the Merino Sheep' (1811), observes, that "the original Spanish sheep, according to Pliny, Solinus, and Columella, were some black fleeced; some produced red or erythræan wool; and some, as those about Cordova, had a tawny fleece. The remains of these ancient varieties of colour may still be discerned in the modern Merino sheep. The plain and indeed the only reason that can be assigned for the union of black and gray faces with white bodies, in the same breed, is the frequent intermixture of black and white sheep, until the white prevails in the fleece and the black is confined to

the face and legs. It is still apt to break out occasionally in individuals, unless it be fixed and concentrated in the face and legs by repeated crosses and a careful selection. In the Merino Southdown (of England) the black may be reduced by a few crosses to small spots about the legs, while the Merino hue overspreads the countenance. The Merino hue, so variously described as a velvet, a buff, a fawn, or a satin coloured countenance, but in which a red tinge not unfrequently predominates, still indicates the original colours of the indigenous breeds of Spain; and the black wool, for which Spain was formerly so much distinguished, is still apt to break out occasionally in the legs and ears of the Merino race. In some flocks half the ear is invariably brown, and a coarse black hair is often discernible in the finest pile. The erythræan, the fuscous, and perhaps the pellico of the ancient Spanish breeds, are precisely the red or fawn, the buff or satin coloured countenances of the Merinos at present; and whatever was the peculiar colour which the elder Columella produced by means of African rams in his Tarentine flocks, we may conclude that the same expedient was adopted by the agriculturists of Bœtica, to convert their coarse into fine-woolled breeds, and to communicate the purest white to the party-coloured fleece."

We have proof, then, that in remote antiquity valuable races of sheep were cultivated in Spain. Before that country became a Roman province it appears to have been in the possession of various tribes. The earliest inhabitants of whom history makes mention were the Iberi; but afterwards came a Celtic race, who, in some districts at least, mingled with the Iberi, and formed a people known as the Celtiberi. The Phœnicians, moreover, not only traded with Spain, but established colonies or settlements on different parts of the coast, and even penetrated into the interior. The Rhodians and the Phocæans, and other Greek powers, also established settlements; nor did the Carthaginians, ultimately expelled by the Romans, neglect a country abounding in corn and mineral productions. There are then several sources whence important breeds of sheep may have sprung before the predominance of the Roman power, which was not thoroughly established until the time of Augustus. At this period one of its exports was, as we have seen, wool of very superior quality. But the Roman power fell, and Spain was invaded by hordes of rude barbarians. First, about the beginning of the fifth century, came the Suevi, the Alans, and the Vandals. These were followed by the Visigoths, who, in the time of Euric (466-83), established themselves as masters of the peninsula. Here we lose all trace of the history of the Spanish sheep; but in the course of a very few centuries some gleams relative to its importance break in

upon us again. In the beginning of the eighteenth century the Saracens defeated the Gothic power on the banks of the Guadalete, and rapidly extended their conquests. Arts and sciences began to flourish, and commerce was prosecuted with vigour. Among the manufactures of Moorish Spain, that of costly woollen fabrics attained to great perfection, and flourished in Seville as well as in other places, as Lerida, Barcelona, &c. By degrees, however, the Moors lost the ground they had acquired, and were driven from the last of their territorial possessions. In the thirteenth century no fewer than 16,000 looms were found in Seville; and Lerida at that time vied with Seville in her woollen manufactures. About a century afterwards Barcelona, Perpignan, and Tortosa, were celebrated for the fineness of their cloths, and the greater part of Europe, together with the coast of Africa, was supplied with them. Upon the final expulsion of the Saracens, the woollen manufacture may be said to have almost ceased to have an existence throughout Spain. No longer were bales of fine wool exported to Bruges and Italy; no longer cloths of admirable texture sent to other parts of Europe or Africa; and the noise of the looms was hushed in the towns which but a few years previously had been peopled by an industrious race of skilful artisans. Still however, in the midst of these civil broils and convulsions, the Spanish sheep was perpetuated in its purity; or at least that breed which Spain may boast as having now given to the world at large, and from the diffusion of which such important results have followed.

It would seem, that in the fifteenth century certain sheep of the Cotswold stock were sent from England to Spain. Stow says, "This year (1464) King Edward IV. gave licence to pass over certain Cotteswolde sheep into Spain—by reason whereof it has come to pass at this day that the staple of the wools of Spain, except at Baydes (Bruges) in Flanders, is so great that our staple is not comparable with it." Baker says, "King Edward IV. enters (1468) into a league with John, king of Arragon, to whom he sent a score of Costal ewes and four rams—a small present in show, but great in the event, for it proved of more benefit to Spain, and more detrimental to England, than could at first have been imagined."

Now the Cotswold sheep were then, as they are now, of the long-woolled breed, and could not have been intended to intermingle with the pure Merinos, but with some of the coarse but long-woolled Spanish breeds, in order to improve the quality of their fleece. At this period England exported immense quantities of wool of long staple, of which Spain received her portion; this, mixed with her native but coarser long wool, was manufactured into various articles, as serges, &c., for which the wool of the true Merino race was not

adapted. That the Merinos owe any of their excellences to the Cotswold strain, is therefore an erroneous opinion. In 1437, Dom Duarté, king of Portugal, and brother-in-law to the king of Castile, applied to Henry VI. for permission to export sixty sacks of Cotswold wool, in order that he might manufacture certain cloths of gold at Florence for his own private use. This wool was intended for a species of cloth of light and delicate fabric, to which the Merino wool, suited for fabrics of a closer texture, was not adapted. Had Merino wool been required, Dom Duarté could have readily obtained it, and have been spared the trouble of sending to England for fine long wool, which he could not elsewhere have procured. There is indeed, and ever has been, a long-woolled breed of sheep in Spain, denominated the *chunah*. It exists even in the provinces where the finest Merinos are pastured, but from which it is essentially distinct. The wool of the *chunah* sheep is long, the staple being about eight inches, almost destitute of curve, much coarser than the Merino, and of decidedly inferior value. These sheep are larger, taller, and heavier than the Merinos, but their head is smaller in proportion, and devoid of wool. That the Cotswold sheep would improve this breed there can be no doubt, and it was in all probability for this purpose that their importation, as before noticed, was effected. Besides these sheep, there are other breeds, and some of dif-

ferent degrees of intermixture with the Merinos, more or less valuable, according to the quality of the wool. Of these some are even confounded with the pure Merinos, the strain of this race prevailing in them. None of these sheep, however, are migratory, or perform journeys according to the season of the year; they are all *Estantes*, or stationary. The pure Merinos are divided into two classes—namely, the *Estantes* or stationary, and the *Transhumantes* or migratory. The stationary Merinos, valuable for their excellent wool, do not perform any journeys, but are restricted to certain pasture-grounds in the Guadarrama mountains, in the Somo Sierra ranges, throughout Segovia, and in Leon and Estremadura. The number of stationary Merinos is estimated at upwards of two millions; that of the *chunahs* and mixed breeds at more than six millions.

Still more numerous are the *Transhumantes*, or migratory Merinos, which are calculated at about ten millions; and of these the Leonese are the most celebrated, those of Soria less so, the stationary breed of Segovia taking an intermediate rank.

Before entering into the migratory system on which the superiority of the *Transhumantes* is supposed, though we think erroneously, to depend, it may be as well to detail the physical characteristics of the Merino breed in general, as presented by the pure Spanish race.

The Merino sheep are long in the limbs, but



MERINO RAM.

the bone is small; the breast and back are narrow, and the sides rather flat; the fore-shoulders and loins are heavy, and the skin under the throat loose and flabby, or indeed pendulous; the

forehead and cheeks are covered with coarse long hair, but the lower part of the face is smooth and velvety; the head is large, the forehead rather low. The male carries comparatively large horns,

spirally contorted, the curvature, as we have seen, being often very graceful. The females are mostly destitute of horns, and where these appendages are present, they are small.

The wool of the Merino sheep is at once exquisitely fine, and admirable for its felting properties. In the number of its serrations and curves it is perhaps unequalled; hence its deserved celebrity. Yet a superficial examination would fail to detect these excellencies. From the thickness of the pile on the skin, and from the abundance of the yolk, which agglutinates on every fibre, sand, dust, or other extraneous matter, the fleece has a hard and unyielding feel upon pressure; but this apparent hardness is a masque to the fleece, and is not the character of the wool itself. It disappears under the ordinary treatment. As to length of staple, the breeds of different provinces somewhat vary. The average weight of the fleece of the ram is from seven to eight pounds; that of the ewe five pounds.

With all their good qualities the Spanish Merinos have some defects, owing perhaps rather to the peculiarity of their management than to any innate idiosyncrasy. They consume a large quantity of food without assuming a proportionate degree of condition; the ewes are apt to be barren, or to miscarry; they yield but little milk, and often neglect their young. They are said to be more subject to cutaneous disorders than most other breeds; but all this is readily accounted for when we consider the system upon which the flocks are managed.

"The excellency of the Merinos," says Mr. Youatt, "consists in the unexampled fineness and felting property of their wool, and in the weight of it yielded by each individual sheep; the closeness of that wool, and the luxuriance of the yolk, which enables them to support the extremes of cold and wet quite as well as any other breed; the ease with which they adapt themselves to every change of climate, and thrive, and retain, with common care, all their fineness of wool under a burning tropical sun, and in the frozen regions of the north; an appetite which renders them apparently satisfied with the coarsest food; a quietness and patience into whatever pasture they are turned; and a gentleness and tractableness not excelled in any other breed." Such characters we may denominate those of *blood*—or in other words properties originally ingrafted and at length established by a long perpetuation of the race without deteriorating intermixture. It is from *blood*, in this sense, that all our races of domestic quadrupeds, by judicious crossings and interbreeding, approach towards perfection.

When fattened the Merino sheep weigh from 12 to 15 or 16 lbs. per quarter.

We may now speak of the long migratory

journeys of the Spanish Transhumantes—journeys of several hundred miles, undertaken twice every year, according to a custom which, as far as we can learn, appears to be of considerable antiquity. If asked on what theory this system was adopted we can only say, that it was most likely based upon the idea that an equality of temperature, as far as it could be brought to bear, was essential to the fineness and closeness of the fleece. It might be, that this nomadic practice originally resulted from the necessity of changing the pasture grounds; or it might have been a received custom from ancient tribes, and so become continued without any reasoning upon the subject, as habits and manners perpetuate themselves among nations, each respectively adhering to those of their forefathers. That this migratory system is necessary we very much doubt; how it can benefit the sheep we cannot tell, unless indeed the quality of the pasturage renders it necessary, which is not the case; and although it may be contended that the Leonese Transhumantes afford the finest wool in Spain, yet it is exceeded by that of the German Merinos, which are stationary and housed during the winter; a plan which might be substituted in Spain for the old system of vernal and autumnal migrations—a system attended by many evils.

The general plan of migration is from the mountains to the plains, and from the plains to the mountains; and the whole is conducted according to old custom, now become law. Formerly indeed a tribunal was established for the regulation of the details connected with this system of migration; it was called the *Mesta*, and consisted of the chief proprietors of these flocks of Transhumantes, by whom the rules were ordained. By the *Mesta* it was decreed that the flocks had a right to graze on all the open and common land that might lie in the way as they pursued their journey; it claimed also a path of ninety yards in width through all the enclosed and cultivated country; and it prohibited all persons, even foot passengers, from travelling on those roads while the sheep were pursuing their course.

According to Tessier the Leonese sheep, after depasturing during the winter on the north bank of the Guadiana in Estremadura, begin their march about the 15th of April, in divisions of two or three thousands. They pass the Tagus at Almares, and direct their course towards Trecases, Alfaro, and L'Epinar, where they are shorn. This operation having been performed, they recommence their travels towards the kingdom of Leon. Some halt on the Sierra, or mountain chain, which separates Old from New Castile, but others pursue their route to the pastures of Cervera near Aguilar del Campo. Here they graze until the end of September, when they recommence their return to Estremadura.

The Sorian sheep having passed the winter on the confines of Estremadura, Andalusia, and New Castile, begin their route about the same time. They pass the Tagus at Talavera, and approach Madrid; thence they proceed to Soria, where a portion of them are distributed over the neighbouring mountains, while others cross the Ebro, in order to proceed to Navarre and the Pyrenees.

The whole spring journey is accomplished in about five or six weeks, and the return occupies the same space of time. A few asses and mules accompany the procession, carrying the clothes and provisions of the shepherds, and the materials for constructing temporary folds at night. The sheep are not driven, but headed by trained wethers; they follow the shepherds, each flock knowing its own conductor.

Here we shall take the liberty of abridging an account of the Mesta system, given in Dillon's *Travels in Spain*, but without binding ourselves to the non-introduction of such observations as may suggest themselves.

The Merino flocks, after spending the summer in the mountains, descend to pass the winter in the milder provinces of Estremadura and Andalusia, where they are distributed into districts called Merindades. Each flock, consisting generally of about ten thousand sheep, has a mayoral, or head shepherd, who is chosen as an active experienced man, well acquainted with the nature of pastures, and the different diseases to which sheep are liable. This chief, or superintendent, has under him fifty shepherds, each of whom is furnished with a good and powerful dog, as a defence against wolves, which are much to be dreaded. It necessarily follows, then, that these flocks are subdivided, each shepherd having his own peculiar charge, to which, under the directions of the mayoral, he expressly attends.

Having arrived at the mountains, among which the sheep have to pass through the summer months, the shepherd's first care is to give the ewes of the flock as much salt as they will eat. Fifty or sixty flat stones are placed on the ground at the distance of five or six paces from each other, and upon these stones the shepherd puts a quantity of salt, then leading the flock to them, he allows them to eat at pleasure. This is frequently repeated, the shepherd taking care not to let the flock feed at this time on any spot where there is limestone, but leading them to pastures having an argillaceous soil, where, the salt having stimulated the appetite, they devour everything with a keen relish, and return to the salt with renewed satisfaction.

At the end of July each shepherd distributes the rams, in the proportion of five or six rams to one hundred ewes. Previously to this they are

carefully kept apart, and are again separated at a proper season. About the middle of September the sheep are marked, which is done by rubbing their loins with ochre diluted in water. Some say this earth incorporates with the grease of the wool, and forms a kind of varnish which protects them from the inclemency of the weather; others pretend that the pressure of the ochre keeps the wool short, and prevents it from becoming of an ordinary quality; others again imagine that the ochre acts as an absorbent, sucking up the excess of transpiration, which would render the wool ordinary and coarse.

For ourselves, we cannot imagine that it acts in any way beneficially—on the contrary; custom governs these things; the *rationale* is never mooted.

Towards the end of September the flocks of Transhumantes begin to leave the mountains for the warmer climate of the plains, where they have to sojourn during the winter. The journey to the lowlands, like the previous journey from the lowlands to the highlands, is regulated by established custom. Where cultivated lands occur the inhabitants are obliged to leave a passage of ninety paces wide for the flocks; but in these tracts they travel fast, going, it is said, as far as six or seven leagues in the course of twenty-four hours. In open uncultivated places, however, the flocks seldom travel beyond two leagues a-day, following their shepherds, and grazing as they gently proceed. Thus they wend their way till they reach the lowlands. Arriving there the first care of the shepherds is to lead the flocks to the same pastures on which they have previously wintered, and in which the greater portion of them were yeaned. There is little difficulty in this task, for the flocks, guided by a sort of instinct, direct their course respectively to their own old feeding grounds, of which they take possession, and which, excepting when constrained, they will not quit.

The shepherds have now to prepare for the winter; folds, made of stakes driven into the ground and encircled by ropes, &c., are constructed, and in these the sheep are nightly penned, guarded by intelligent and powerful dogs, in order to defend them against the incursions of the wolf. The shepherds build themselves huts with stakes and boughs; for which purpose, and also for fuel, an old law allows them to cut off one branch from every tree. During the winter they are not idle; and in the month of March have to attend to the lambs yeaned in that season. They have to dock the tails of the lambs, for the sake of cleanliness, five inches below the rump; they then mark each lamb on the nose with a branding-iron; they saw off the tips of the horns in the males that they may not hurt one another at play; and such lambs as

are intended for bell-wethers, to head their own tribe, are now castrated.

In April the preparations commence in earnest for the return of the flocks to the mountains. Indeed the sheep themselves, probably from habit, are aware of the time appointed for their departure, and express by their restless movements their anxiety to set off. The shepherds must now be alert and vigilant, otherwise whole flocks will decamp of themselves, and take the direct road back to their mountain pastures. In this case the only danger arises from the wolf. Should they escape the attacks of this savage beast, they will be found on the old ground, quietly awaiting the arrival of their companions. The mountain pasture-ground is divided by land-marks, and each compartment is calculated to be capable of supporting a thousand sheep. Beyond these land-marks the flock is not allowed to stray. On the 1st of May, while the sheep are on their journey, the process of shearing usually commences, unless the weather be unfavourable. This business is soon dispatched, seldom delaying the flock more than a single day. Buildings, called *esquileos*, are erected at different stages along the first portion of the route; these are rude structures divided into two compartments, each of which is capable of containing upwards of a thousand sheep. Besides the *esquileo*, there is a long, low, narrow hut, called a sudatory, in which, during the night previous to shearing, the sheep are kept, huddled up together as close as possible, in order that they may be thrown into a state of heavy perspiration. By this process the yolk of the wool is melted, and the fleece is rendered softer and better adapted for shearing. No previous washing takes place; indeed the greatest care is taken to avoid humidity, for the fleeces being piled upon one another after shearing would ferment in case of dampness in them, and rot. Hence, too, the flocks are never suffered to move out of their folds till the morning sun has exhaled the dews of night; nor are they permitted to drink at brooks or stagnant waters where hail has fallen, experience having shown that such waters are highly pernicious.

The number of shearers collected at each *esquileo* is about two hundred; and each man is capable of shearing from seven to eight ewes, or from four to five rams a-day, so that in one day a flock of a thousand sheep is, at a single *esquileo*, deprived of the wool. After shearing the sheep are turned into the second compartment of the *esquileo*, and generally continue their journey on the following day. Thus flock after flock, for five, six, or seven days, arrives at one *esquileo*, and departs, each in its turn, leaving its fleece behind. The fleece of the ewes, though not so heavy as that of the rams, is far finer, and consequently more intrinsically valuable. The produce of each sheep

is divided into three portions; or, if we take in the trifling quantity of coarse wool on the forehead, the cheeks, the tail, and the legs below the hocks, four portions. Excluding the latter, we may designate the portions respectively—first, as picklock or *refina*, from the withers, back, and sides, to the root of the tail; secondly, the *fina*, a wool of excellent quality, from the lower part of the sides, the belly, and the base of the hinder limbs, and upper part of the neck; thirdly, the *terceira* or third sort, from the lower part of the neck, the chest, the shoulder joint, the fore-arms, and the thighs about the hock up to the stifle or femorotibial joint (analogous to the knee). The average weight of the fleece is eight pounds from the ram, and five pounds from the ewe.

The picklock Merino (we are speaking of first-rate sheep) is beautifully curved, very fine, and closely serrated—the serrations being about 2,560 to the space of one inch. Of course there are among these sheep many of inferior quality; and, as we have said, the Sorian race are inferior to those of Leon. The work of shearing being over, the flocks pursue their course, and in due time they arrive at their summer quarters. In August the rams and ewes are allowed to mingle together, so that the yeanning time shall occur after the hill pasturage is over, and before the return to the hills again, which, as already stated, commences in April, at which season the lambs will have acquired sufficient strength for the journey. To this end the lambs are placed on the best pasturage, in order that they may thrive as rapidly as possible.

The Merinos are by no means good nurses, and in bad seasons, or when there is a deficiency of pasturage, it is found necessary to destroy great numbers as soon as yeanned. The males are the first sacrificed, and the survivors are each suckled by two ewes, from an idea that a ewe, if she completely and perseveringly nurses her lamb herself, will yield a deteriorated fleece. In unfavourable seasons it sometimes happens that more than half the lambs which are yeanned are killed. The flesh is sold to the peasants and villagers for a trifle. The skins are sent into Portugal, whence they are imported into England, and manufactured into delicate glove leather. Many are cured with the wool on, for the purpose of being made up into articles of dress. The wool is soft and silky, and disposed in little curls. The Spanish shepherds generally wear jackets of sheepskin, and are skilful in the use of the sling, of which circumstance Don Quixote, according to Cervantes, had sufficient experience, when he attacked the flocks of sheep on their migration, regarding them as armies of mail-clad men, and their cries as the “neighing of steeds, the sound of clarions, and the noise of drums,” whereas, as Sancho gravely observed,

nothing was to be heard "but abundance of bleating of ewes and lambs."

Such is an outline of the Mesta system as carried on in Spain. There are, as we have said, stationary flocks, of various breeds, which do not perform any migrations, and whose fleece is very inferior to that of the Transhumantes. How far the Mesta system is conducive to the value of the Merino wool, may admit of a question. The Merinos of Germany are not treated on such a plan, and their wool is superior to that of the Spanish. Perhaps, however, there may be some good reasons for this system in Spain. It is in fact asserted by many that the Spanish Merinos, if confined exclusively to the low country, speedily degenerate; the plains are dried up by the scorching sun of summer; the flocks are therefore exposed to drought and famine, and could never exist in such numbers as they do. On the other hand, were they exposed on the mountains during the winter, they would find their pasturage fail, and numbers would perish from cold, snow-storms, and other casualties.

Be this system, however, necessary in Spain or not, one effect of it is, that immense tracts of country are never touched by the agriculturist, but remain, age after age, mere sheep-walks. This has been felt as a serious evil, and several Spanish writers have employed not only argument but invective against the system. Among these is Padre Sarmiento. This monk inveighs in strong terms against it, and attributes its origin to the depopulation caused by the ravages of the plague, consequently he regards it as a curse springing out of a curse. He is indignant at the use of the term *Mesta*—a corrupt word, or rather one of altered meaning, and of which the proper signification is a mixture of grain and seed, such as barley, beans, oats, lentils, &c. He affirms that English sheep were first introduced into the mountains of Segovia without any contemplation of the *Mesta*, or any annual migration to Estremadura. But that shortly afterwards (from 1348 to 1350), Spain was sadly depopulated by the plague, and that then "the great space of uncultivated land, and the want of husbandmen, acted as encouragements, both to shepherds and cattle, to stray beyond their boundaries, and wander into districts where no impediments occurred to their progress, making a casual use of the land, without a thought of proper cultivation, as this would require more hands than they were able to furnish."

From this it would seem that English sheep were introduced into Spain earlier than the reign of Edward IV., perhaps before the reign of Edward III., in whose time it was that the terrible plague alluded to occurred; this disease first appeared in Asia, it ravaged North Africa, and then

invaded Europe, spreading itself through Spain, France, and England. In the latter country it made so much desolation, that one-half the nation was swept away. In London, during only one year, above 50,000 persons were buried in the churchyard belonging to the Cistercians.

But, granting this early introduction of English sheep, we have no proof that they were ever blended with the true Merinos, nor are we quite sure that the Mesta system resulted from the desolation caused by the plague. From the laws and regulations which bear upon it, it scarcely bears the aspect of such a chance affair; a tribunal, traceable to the middle of the fourteenth century, would rather lead us to infer that some rules were necessary for the regulation of an established custom, than that it sprung up, and at once became adopted so generally, under given restrictions on the one hand, and privileges on the other.

Sarmiento applauds a law made by Ferdinand, king of Portugal, that no person who was not a husbandman, or his servant, should keep sheep, either for himself or others; and that, if any persons were desirous of keeping them, they must bind themselves to cultivate a certain portion of land, under penalty of forfeiting their flocks and cattle, in case this regulation was not exactly complied with.

We shall not attempt to discuss the points of political economy involved in this question. A few general observations, however, may be permitted. Sarmiento states, that where there is *no Mesta there is a population*, and that where there is *the Mesta there is no population*. But according to his own showing, granting his correctness, the depopulation did not arise from the *Mesta*, but the *Mesta* from the depopulation. But it may be said the *Mesta* militates against population and the increase of agriculture. Under a wise government, and in years of tranquillity, neither the *Mesta*, nor any conventional system of the sort, can prevent or retard the rapid increase of population; but, as to the extension of agriculture, that must ever depend on the nature of the soil, and other contingencies. Perhaps it might be desirable that some of the vast sheep-walks of Spain should be, where practicable, reclaimed. But to what extent are they adapted for agricultural purposes? A very considerable portion of the great flats of Estremadura, of Andalusia, and other districts of Southern Spain, are naturally arid and sterile, without water and without trees to retain and attract moisture. In the winter they are partially covered with green herbage; in the summer they become burnt-up deserts, not much unlike those of Africa. As these *are*, they are valuable pastoral adjuncts to the mountains; but an entire change of circum-

stances must arise to render the planting of trees, irrigation by cut water-courses, and other long and expensive processes—which would be absolutely indispensable—so profitable as to induce the outlay of capital, even if capital could be found. Again, the bleak elevations of the Montana and Molina de Aragon, &c., present innumerable obstacles to agriculture; yet, during the summer season, they are among the best pastures in Europe, and are capable of supporting flocks and herds innumerable. In the winter, on the contrary, from cold and storms, the sheep, as we have said, would have their numbers fearfully diminished; at that season the flats offer both pasturage and a milder climate. Thus, then, the high country and the low counterbalance each other—take away the former, and the latter loses half its importance, and *vice versâ*; and hence, supposing it possible to cultivate the wide flats to profit, the importance of the mountain ranges would be almost lost, so that, in this point of view, the gain from agriculture—even if successfully practised—would be less profitable than would at first appear.

It must not, however, be supposed that there are no cultivated tracts through which the flocks pass—quite the contrary; and it cannot be denied that the spring corn is often injured to a great extent by the flocks. The same observation applies to the vineyards in autumn, and to the commons on which the stationary sheep of the agriculturist feed, and which are frequently grazed bare. The shepherds of the Mesta, like servants in authority generally, are probably careless as to keeping within the width by law allotted to the flocks (ninety paces) in traversing cultivated tracts, nor is it likely that redress can be obtained for any injury either carelessly or wantonly committed. Evils like these, however, are capable of correction.

The alternation of flats and elevated ranges, which has in Spain, we are inclined to think, given rise to the Mesta system, is precisely the case in several parts of Italy, particularly in the kingdom of Naples, where the mountain range of the Sylla, and the plains of Calabria, the highlands of the Abruzzi and Basilicata, and the wide flats of Apulia, alternate with and aid each other in a pastoral sense; and in these districts the sheep and shepherds are migratory; they tenant the mountains in summer, winter in the flats, and return to the mountains in spring. The following interesting extracts are a portion of an original communication from a traveller to the *Penny Magazine* for 1833.

The Abruzzesi, or peasants of the Abruzzi, are a pastoral people of two mountain provinces in the kingdom of Naples, which, comparing things with our own, may be called the highlands of that country. “The plains about Sulmona and Chieti,

two of the most important cities in those parts—indeed the whole of the valley of the Pescara—the flats and declivities of the hills that surround the beautiful lake of Celano, some strips of land along the coast of the Adriatic, and a few other places, are susceptible of profitable cultivation, and are well cultivated, but generally speaking the country is mountainous and rugged in the extreme, offering little to rural economy save almost boundless sheep-walks, and browsing grounds for goats. Nature has therefore made the inhabitants of this country a pastoral people, and they are so to a degree which can hardly be imagined but by those who have visited these much neglected but interesting provinces. Entering fairly into the Abruzzi, above the interesting town of Castel di Sangro (as you do coming from Naples), the traveller finds himself in a new world, the simple primitive manners of which are most striking. He no longer sees the vines hung in festoons from the elm trees, nor the broad-bladed vividly green Indian corn, nor the exuberant soil bearing two crops, nor the flowering orchards and shady Italian pines, nor the thronging noisy population he has left behind him in the agricultural and most fertile province of the Terra di Lavoro, or Campagna Felice; but he sees immense flocks of sheep spread over the mountain pastures, he hears the continual tinkling of goat-bells from the mountain summits, he observes that the cottages and hamlets, instead of being surrounded by gardens and cultivated fields, are flanked and banked by sheep-cotes and stables, and that almost the only quality of person he meets on his way is a shepherd, clad in his sheep-skin jacket, with sheep-skin buskins to his legs, and followed by his long white-haired sheep-dog. Instead of the water being carried along in stone or brick aqueducts, for the purposes of agriculture and horticulture, as in the lowlands, he sees it here and there caught and conducted in hollow trees, cut from the mountain's sides, which are fashioned not like our pipes, but like open troughs, so that the flocks may drink out of them at any part of their course. Besides these simple ducts, he occasionally passes little stone fountains, equally rustic in their structure, before which are placed a number of hollowed trees for the convenience of the sheep. In short, the aspect of the country is essentially pastoral.

“Winter is felt in these mountains in great, and in some places in its utmost, rigour. The lofty summits of the Gran Sasso d'Italia (the Great Rock of Italy, the highest peak in the peninsula) are nearly always covered with deep snow; so are the mountains above Aquila, the capital of the provinces, and many others of the ridges, while the crevasses (rifts) in the superior part of Monte Majello, that towers above Sulmona, offer enduring and increasing fields of ice and

glaciers that may astonish even the traveller who has seen those of the Alps. Among the wild beasts, the bear and the wolf are still found in considerable numbers. The Piano di cinque miglie, or the plain of five miles, which is a narrow flat valley, almost at the top of the Apennines, but flanked by the summit of these mountains, and which is the principal communication with Naples, is subject to drifts, and those hurricanes called *tourmens*. Accumulations of snow frequently render the road impassable, and sometimes endanger and destroy life. The winds that blow from these mountains, even so early as the end of summer, are often bleak and piercing. The numerous flocks that feed on and beautify their pasture in summer would droop and perish if exposed there during the winter. Consequently, at the approach of that season, the Abruzzi peasants migrate with them into the lowlands of Puglia.

"The plain of Puglia is an immense amphitheatre, whose front is open to the Adriatic sea; and the rest of it is enclosed by Mount Garganus, and a semicircular sweep of the Apennines, prominent among which is the lofty cone of Mount Vultur (an extinct volcano, the craters of which are now romantic lakes). The mountains, however, generally defend the plain from the worst winds of winter, and the climate is as mild and genial throughout the year as might be expected from the favourable latitude of the place, and its trifling elevation above the sea. The want of water, and the entire absence of trees which would attract humidity to the thirsty soil, have been reasons why this immense flat has been left almost untouched by the plough or spade. The great expanse presents the appearance of an eastern desert, over which, when not sparingly enlivened by the presence of the Abruzzi and their flocks, you may travel in all directions for miles and miles, without meeting a human being or any signs of human industry,—without seeing a tree or a bush, or any elevation in the dead flat to mask the view of the Adriatic and the surrounding mountains. It is probable from the advantages it offers, and the difficulties of their own mountain climate, that the shepherds of the Abruzzi have in all ages resorted to it as they do now. In modern times a department of government has been appointed exclusively to the charge of the Tavogliere de Puglia, as it is called in the Neapolitan statistics, and the head of this department, who was generally a person of rank, was obliged to reside occasionally at Foggia. Of late years some changes have been introduced in this branch of the administration.

"Every flock of sheep as it arrives is counted, and has to pay a certain sum proportionate to its number, for the right of pasture; and small as are

these rates, from the immense droves that come they form an aggregate which, after the expenses of collecting, &c. are paid, annually gives to the Neapolitan government many thousand ducats.

"Large sheds and low houses, built of mud and stone, that look like stabling, exist here and there on the plain, and have been either erected by the great sheep proprietors, or are let out to them at an easy rate by the factors of the Tavogliere. Other temporary homesteads are erected by the shepherds themselves as they arrive, and a few pass the winter in tents covered with very thick and coarse dark cloth, woven with wool and hair.* The permanent houses are generally large enough to accommodate a whole society of shepherds. The temporary huts and tents are always erected in groups, that the shepherds of the same flocks may be near each other. The sheepfolds are in the rear of the large houses, but generally placed in the midst of the huts and tents. On account of the wolves that frequently descend from the mountains and commit severe ravages, they are obliged to keep a great number of dogs, which are of a remarkably fine breed, being rather larger than our Newfoundland dog, very strongly made, snowy white in colour, bold and faithful. You cannot approach these pastoral hamlets, either by night or day, without being beset with these vigilant guardians, that look sufficiently formidable when they charge the intruder, as often happens, in troops of a dozen or fifteen. They have frequent encounters with the wolves, evident signs of which some of the old campaigners show in their persons, being now and then found sadly torn and maimed. The shepherds say that two of them of the right sort are a match for an ordinary wolf."

Over this wide plain, on which the battle of Cannæ was fought, the flocks of sheep feed at peace, guarded by the shepherds and their dogs. Some traces of the site of the ancient town of Cannæ still remain, and the shepherds call the surrounding district "the field of blood." That great artist, Edwin Landseer, has painted two pictures by way of contrast one with the other, entitled respectively *Peace* and *War*. Let us fancy the plains of Cannæ covered with two hostile armies, Roman and Carthaginian. We hear the thundering tread of the legions, the battle shock, the shouts of exultation, the cries of despair or agony,—we almost realize the *guadia certaminis*, the mad rapture of the conflict, and we see the ground stained with blood, and bestrewn with broken swords and shields, helmets and breastplates, and

* Not, perhaps, different from the tent-cloths mentioned by Virgil:—

"Nec minds interea barbas, incanaque menta
Cinyphii tondent hirci, setasque comantes,
Usum in castrorum, et miseris velamina nautis."

Virgil, *Georg.* iii., line 311 et seq.

dead or dying men. But let "a change come o'er the spirit of our dream." The plain of Cannæ is a lonely flat. Its silence is unbroken save by the bleating of sheep or the bark of the faithful wolf-dog. Flocks nibbling the short grass are dotted over its extent as far as the eye can see; huts stand where the tents of leaders and chiefs flaunted in the pomp and circumstance of war; and shepherds, a simple quiet race, clad in their sheep-skin garments, count their sheep where mailed warriors marshalled their legions, and gave the signal for the dread onset. Have we not here a picture of War and Peace?

This is a digression, for which we must request pardon; but it is one which any one might make when speaking of the plains of Cannæ, now noted only as extensive sheep-walks.

It is in winter only, as we have said, that the flocks are depastured in the *Pianura di Puglia*. In the middle of spring they slowly retrace their steps to the *Abruzzi*, to return again to the *Pianura*, or Plain, on the approach of winter.

Here, then, we have a sort of *Mesta* system; and as like causes produce like effects—as the peculiarities of soil and temperature in one place render a certain system requisite, so may we expect the same or a nearly similar system to obtain in other places under the like circumstances. We say this because some attribute the *Mesta* system of Spain to any cause but that of the nature of the country. We grant that there are stationary *Merinos* and stationary sheep of other breeds in Spain, but these occupy stations capable of affording both summer and winter pasturage; and surely, in so large a country as Spain, such situations must be abundant, but then, as abundant are pasturages available, these only in summer, those only in winter, which, without any preconceived plan or theory, would necessitate a change of locality, a sort of migration. For centuries this migration might be irregular, and conducted on no authorised rules. The necessity of some fixed plan would soon be felt, regulations would in due time become established, laws enacted, and thus a system would be established (whether for good or for bad it matters not), which, sanctioned by antiquity, and corroborated by habit, would become blended with the manners and feelings of a people. It is thus that the Arab rides the mare only, while the *Gaucha* of South America despises the mare, and mounts the stallion. It is thus that certain ancient practices in every country linger so long in spite of reason, and are eradicated with so much difficulty. It is thus that the "good old way," the way of our forefathers, acts as a bias, perhaps unknown to ourselves, on our feelings, modifying even our mental temperament, our peculiar predilections; and so, whether the old *Mesta* system in Spain be advantageous or the contrary, in reality it will be

continued, because it has been, and because ancient usage has established it.

Mark! we do not say that it is not a good system according to the nature of the country. We are aware that some writers, and among them the late Mr. Youatt, speak of it with disapprobation, but, in our opinion, without taking circumstances sufficiently into consideration. They forget that all countries are not like England—they forget that customs spring out of necessity; and because they cannot trace this system back beyond certain dates, they fancy that instead of being antique, or primitive, it is comparatively modern, and the result of other causes than those connected with soil and climate. They forget that the Laplander pursues a migratory system with his herds of rein deer, and the Tartar with his flock; nay, that wild animals pursue the same from instinct. We acknowledge that the Spaniard attributes the superiority of the fleece of the *Merino* to this migration, but here he is undoubtedly in error. The source of his error is palpable. These valuable sheep have, for the purpose of preserving them, been conducted age after age from the mountains to the plains, and from the plains to the mountains, and have kept up a name for their fleece. The fleece is the great object in the eyes of the shepherds and extensive sheep owners. Custom had long rendered familiar what necessity first constrained, and hence the migration, its real motive being overlooked, was soon regarded as the great plan by which alone the goodness of the wool could be maintained, if indeed not the cause of its superiority. Thus is popular opinion ever warped, and thus in ordinary minds are incongruous causes and results combined. We might here write an essay on popular ignorance relative to the connection between cause and effect. We leave it for an abler hand: our object here is the sheep.

Though the superiority of the wool of the *Merino* sheep of Spain was acknowledged for centuries over Europe, yet the idea of improving the native breeds by crosses with the Spanish seems never to have been entertained till a comparatively recent period. Wool was indeed largely exported from Spain into England, Germany, France, and other continental states, where the manufacture of fine cloth was carried on; but the attempt at rendering the inferior fleece of their own flocks available for this purpose, by a gradual intermixture of them with the *Merinos*, was long neglected. England indeed had her own sheep of great value, both short and long woolled, and therefore felt less than many other countries the necessity of any amelioration; perhaps even the great wool growers might doubt the possibility of improvement.

It was in the bleak land of Sweden, the country of *Linnæus*, *Hasselquist*, and other great

naturalists, that the bold attempt was first made to naturalize the Merino sheep of Spain, and to improve the native race by judicious intermixtures. To judge from the climate and productions of Sweden, it would have seemed that such a country was one among the most unpropitious for the experiment—but natural history was zealously cultivated in Sweden, nor were the bearings of this science upon the domestic animals of the farm and field neglected; and in this case its practical utility was fairly tested. The native sheep of Sweden are of a tall and slender figure, mostly short-horned, hardy, and active; their fleece is coarse, and of moderate length; the flesh is lean, but not ill-flavoured, yet, taken altogether, they have nothing to recommend them. Already had attempts been made to improve the breed by the importation of sheep from England and Germany, but with uncertain or rather variable success, till at length in 1723 M. Alstroemer introduced a small flock of Merinos. The innovation was at once bold and patriotic, but the success of the experiment demanded judgment and perseverance. Treatment, soil, and climate alike demanded consideration, and hence a combination of circumstances required unremitting attention; and it was found that when these were neglected, the success of the plan failed. The Swedish government however wisely seconded the views of M. Alstroemer, and in 1739 established an agricultural or rather pastoral school, at the head of which this zealous gentleman was placed. Premiums were granted to all such persons as, by judicious crossing with the Spanish sheep, produced the best wool, and thus a spur was given to exertion and persevering industry. The design succeeded, insomuch that in 1764 Sweden possessed 65,369 pure Merinos, and 23,384 of an improved and really valuable mixed breed, yielding not only good wool, but mutton of excellent quality. The consequence was a diminution in the importation of fine wool for clothes, and a proportionate consumption of the home-grown material. It must not however be supposed that the native sheep of Sweden became all changed; the flocks of the humbler farmer, and of those residing in uncongenial localities, continued unimproved, and yielded their coarse wool for the garments of the peasantry. Yet since 1764 a gradual alteration has taken place, and nearly half the sheep of Sweden are now of the better breed.

None of the sheep in Sweden, whether Merinos or cross-breed, are managed on the migratory system; the climate and pastures of Sweden would forbid this, for even the lowland meadows in winter would not afford sustenance. At all seasons the sheep are housed at night, on account of the wolves, which are numerous and daring. During the winter they are housed altogether, excepting perhaps for a short time every day, when they

breathe the fresh air, while the sheep-house is cleaned out and ventilated. These sheep-houses are often too small and consequently over-crowded, but this evil is avoided by the wealthier farmers, who are careful of the health of their flocks, and pay every attention to their comfort. The Merinos are used for breeding when turned two years of age, and sent to the butcher at seven; they are shorn in July, after having been previously washed. The milk of the ewes is left for the lambs, but this is not the common practice, as it respects the native breeds, from the milk of which cheese is made in large quantities.

After an interval of some years, Saxony followed the example of Sweden. Anxious to repair the devastations committed in his dominions during the seven years' war, the elector of Saxony obtained, in 1765, about three hundred Merino sheep selected from the best flocks in Spain. After a lapse of ten years, it was found that the Merino stock had not only preserved its original properties, but had by intercrossings established a mixed breed, which yielded neither in the fineness nor excellence of the fleece to the best sheep of Spain. The wool of Saxony quickly became celebrated, and more than rivalled that of Spain in the market, and the woollen manufactures at the same time rose in reputation. It would appear indeed that the Merino succeed better in Saxony than in Spain. In 1809 Saxony reared about 1,600,000 sheep of all kinds, and could boast of 900,000, partly pure Merino, and partly of the most improved and valuable crosses.

It must not be supposed that no other states of Germany endeavoured to imitate the example of Sweden. In 1756 a spirited and intelligent Prussian, M. Fink, had already made a well-directed essay in improving the breed of sheep by some of the Silesian flock, which yielded superior wool. Twelve years afterwards the same individual purchased a few of the new breed of Saxony, called the Saxo-merino sheep, and in 1778 he imported a number of Merinos directly from Spain. These importations afforded good materials upon which to work; nor was imperial encouragement wanting. Frederick the Great had devoted his attention to the improvement of the agriculture of Prussia, and had expended, between the years 1760 and 1778, forty millions of dollars, in the conversion of morasses and sterile tracts of land into corn-fields and rich pastures; agricultural schools were instituted, and schools for the training of shepherds; and the work of improvement made rapid progress. In 1786 the emperor imported from Spain a hundred rams and two hundred ewes, and a few years afterwards, the meritorious individual above alluded to went from Prussia to Estremadura, in order to obtain a still greater supply. From these importations, judiciously crossed, Prussia soon

possessed large flocks of admirable sheep; of which it is calculated that 2,600,000 are pure Merinos, 5,450,000 of the improved breed, and 4,600,000 of the old unimproved races. Besides these there are about 200,000 goats fed in the mountain districts.

Similar attempts were made at improvement in Austria in 1775, when the Empress Maria Theresa imported three hundred Merinos from Spain. These were placed on an imperial farm in Hungary, where an agricultural school was established. From this school, not only were properly trained shepherds sent to such farmers as required their services, but printed instructions were issued relative to the treatment of fine-woolled sheep, and the proper modes by which their progressive improvement might be effected. From time to time subsequently several importations of Merinos from Spain have been made into Austria. It has been calculated that there are from 16,000,000 to 17,000,000 sheep in Austria, including her Hungarian territories, of which about one-eighth are of improved breeds.

About the year 1780 the small German states of Ansbach and Baireuth established agricultural and shepherd schools, and imported rams and ewes principally of the Saxo-merino breed, but in about ten years afterwards Merinos were procured from Spain.

In 1786 the Duke of Württemberg bought a small flock of sheep in Spain. Unfortunately these had to travel all the way by land, and out of sixty-five, nine were lost on the long journey through France, Savoy, and Switzerland. In the revolutionary war, a few years after this importation, the provisional government of Württemberg, on the conclusion of an armistice, gave to the French General Moreau thirty-two Merinos of their breed as a valuable present. The general subsequently presented these sheep to the Agricultural Society of Strasburg. In Hanover, Mecklenburg, and in most other parts of Germany Merinos or Saxo-merinos now prevail.

The Saxon or Merino sheep is the animal which best remunerates the Mecklenburger, and forms the especial object of his care and attention. "They were brought," says Mr. Carr in the *Agricultural Journal*, "to these countries from Saxony about the year 1811, and are now universal. The greatest pains are taken to produce fleeces as nearly equal as possible over the whole flock. The nature of this sort of sheep is so little known in England, although an object of such vital importance to the British Australian colonies, that I venture to hope a description of it may be acceptable. The Merino is a long-legged, thin-bodied, ugly animal, with a fleece varying in weight, in proportion to its coarseness (although fine wool is specifically heavier than coarse), from 2lb, to 3lb. The staple is very close

and thick growing, greasy or oily to the feel, elastic and soft, very tenacious, and formed differently from any other wools, with a number of minute regular bends or curves in each hair. There are always different sorts of wools upon the same sheep, and that animal is of course the most esteemed which produces the highest qualities in the greatest proportion. Breeding successfully with this view is a most difficult science, requiring years of pains-taking intelligence to obtain a knowledge of. I was present at the exhibition of twenty-two rams at the cattle show of Güstrow in Mecklenburg in May, 1837. The specimens to an inexperienced eye appeared much alike; they were carefully washed and shorn; the fleeces were numbered, and sent to the most eminent woolstaplers at Leipsic, where they were submitted to accurate assortment and valuation.

"The Merino is supposed to be indigenous to Spain, and known to have been first introduced into Germany in 1765 by the then Elector of Saxony. Shortly after (about 1775) another small flock was brought to Austria, and subsequently, in 1786 and 1802, to the imperial domains of Holditch in Hungary and Mennersdorf in Austria. From these small beginnings has this valuable animal been spread over these immense countries. But there are two distinct breeds which differ materially in shape and the quality of their wools—first, the *Infantado* or *Negretti*, distinguishable by shorter legs and a stouter make, the head and neck generally short and broad, the nose short and turned up, and the body round like a barrel; the wool is often matted upon the neck, back, and thighs, and grows upon the head to the eyes, and upon the legs to the very feet. The grease in the fleece is almost pitchy, and as the dust becomes incorporated with it, the washing is a matter of difficulty and risk; the greatest care is at all times necessary in this operation. A warm mild day without harsh drying wind is indispensable, and care must be taken never to rub the fleece with the hand. A marl pit with a depth of from eight to ten feet of clear water is a favourite washing place, and is thought to become better every year. The sheep are thrown in from a stage, in the evening, and made to swim the whole length of the pond (twenty or thirty yards), between rails with boards on one side, from which women or boys assist them through their bath by placing wooden rakes or crooks under their chins, and so pressing them onwards. When the water has dripped from the fleeces for an hour or two, the sheep are put into a house for the night, as close together as possible, in order to cause the greater evaporation, and the next day they are swam three or four times through the same pond, the last time the head being rubbed a little; they are then kept in the house (well supplied with clean straw), on dry food for three

or four days, until the wool by sweating, as it is termed, has recovered its characteristic softness.

"The fleece of this species is generally thick, closely grown, and abundant. Ewes may average two and a quarter, and even three and a quarter pounds, by careful feeding (which, however, must never be carried so far as to produce fatness, for the wool would then become wiry and hard); rams and widders may bring four pounds, and even six pounds. This is the animal which came to Austria from Spain.

"Secondly, the other distinct breed is the Saxon importation, and is called *Escorial*. Their shape differs markedly from the *Infantados*;—longer legged, with a long spare neck and head, with very little wool on the latter; a finer, shorter, and softer character in its fleece, but deficient in quantity. One and a half to two pounds is frequently the amount from ewes, and two to three pounds from rams and widders. On being presented to the Elector of Saxony in 1765, they received the appellation of *Electorals*. A great deal of trouble has been taken to combine the advantages of both breeds by crossing, but with doubtful advantages; and although the mixed breed has been found suitable for crossing with sheep not thoroughbred (called *Mestizen*), yet experience has shown that to breed with advantage, all the rams, be the ewes what they may, should be either thoroughbred *Infantados* or *Escorials*, and that the same strain of blood should be persevered in. I know an instance where a large and valuable flock has been for years retrograding in consequence of one unsuitable ram having been introduced twelve or fourteen years ago. Good rams are, of course, becoming every year more attainable, but there are examples of breeders in Saxony who still obtain for distinguished rams as much as one hundred, two hundred, or even three hundred louis d'ors, of nineteen shillings each."

We may here observe that in Spain a distinction is made between the *Negretti* and *Infantados*, which Mr. Carr overlooks. M. Lasteyrie thus characterizes the different flocks of the Leonese migratory Merinos:—1st, The *Escorial*. This is supposed to have the finest wool of all the migratory sheep. 2ndly, The *Guadaloupe*. These have the most perfect form, and are likewise celebrated both for the quantity and quality of their wool. 3rdly, The *Paulars*. These bear much wool, of a fine quality, but they have a great degree of *throatiness*, and a decided enlargement behind the ears. The lambs have a coarse and hairy appearance, but this coarse coat is succeeded by excellent wool. 4thly, The *Infantados*. These when young have the same hairy coat as the *Paular* lambs, but they exchange it for excellent wool. 5thly, The *Negretti*. These are the largest and strongest

of all the travelling Spanish Merinos; their wool is of good quality.

Although Sweden so early commenced the improvement of the native sheep by Merinos, her neighbour, Denmark, was tardy in following the example. Attempts were first made by some agriculturists about the year 1780, and a few Merinos were obtained. The success was not decided, probably the mode of treatment was not understood; at all events the impression made on the general character of the Danish sheep was very limited. However, in 1797 the Danish government took up the matter with spirit, and procured from Spain 300 Merinos of the Leonese breeds, which were placed on a farm at Esserum, about eight leagues from Copenhagen. They were skilfully managed, and although they have not yet superseded the native breeds, nor even extended their ameliorating influence to every province, they have in many places proved of the utmost utility, and greatly modified the characters both of the sheep and wool. A great quantity of fine wool is exported from Copenhagen, and according to Mr. McCulloch, the amount received by England from Denmark in 1837 amounted 516,227 lbs.

Thus then over Sweden, Denmark, and Germany, Hungary,* Belgium, and Holland, have the Merino sheep spread, everywhere producing more or less marked effects, by intermixture with the native races. It is only however since 1800 that the German wool trade with England fairly commenced, and now Germany beats Spain in the markets. The German wool makes a softer cloth; it is capable of being spun to a greater length; it is as fine, but has more numerous curves and serrations, and its good qualities are now thoroughly appreciated. The Merinos and improved breeds are, however, not kept without expense, care, and attention; "they are housed and nursed as carefully as the race-horse is in a sporting stable." This being the case, it cannot surprise us that breeds of inferior wool still maintain their ground. This inferior wool is useful for making a good second cloth—perhaps often equal to that produced by the Southdown wool; hence it is imported into our country, where it sells well, or rather, perhaps, did sell, until the markets began to be supplied by better home-grown wool, rendering the finest sorts only acceptable.

In France the great minister Colbert was the first who turned his attention to the improvement of the native sheep. In the beginning of the eighteenth century he brought over, at his own expense, several

* The chief wealth of Hungary is now derived from its sheep. A few years since their number was estimated at seven millions, of which three millions were the exclusive property of Prince Esterhazy.

Merinos from Spain. His views, says M. La-steyrie, were useful, and founded on well digested considerations; but they were also new, and, of course, therefore they met with opposition. About thirty years after this attempt M. de Perce imported a small flock of Merinos from Spain, and their introduction was attended by very happy results. This fact gradually excited public attention, and as the farmers began to see, from the success of the experiment, that their former notions and prejudices were absurd, they began to wish for the means of improving their flocks by the introduction of the foreign breed. From the time that this impression became general the amelioration of the French sheep was pursued with increasing energy; yet it was not until some years afterwards, and after many experiments, repeated during the space of several years, that M. Daubenton, a gentleman who applied with indefatigable industry to the subject, was enabled to lay the solid foundations of future improvement. He published an excellent treatise, entitled "Instructions to Shepherds and Owners of Flocks," which essentially contributed to the desired end, and he had the good fortune to be employed by the French government to realize his own schemes. In 1776 M. Trudaine, Intendant of Finance, seeing that Spain, who had hitherto contented herself with the profit desired from the raw material she exported, now began to establish cloth manufactories of her own, became apprehensive that as soon as those Spanish works were sufficiently extended the importation of Spanish wool would be prohibited, and that when deprived of this foreign supply, unless indeed a great improvement in the quality of her native fleeces could be effected, France would lose the advantage accruing to her from her manufactures of fine cloths.

The fears of the minister, as to Spain becoming a great manufacturing country, at least under the circumstances under which the country has been placed in the modern times of her history, were, we think, chimerical; nevertheless, they proved highly beneficial to France. M. Daubenton, who had made many experiments, and who was decidedly of opinion that the soil and climate of France were more favourable to the production of fine wool than those either of Spain or England (inasmuch as the burning heats of the one, and the general humidity of the latter were absent), was immediately consulted, and afterward intrusted with the general management of the important business. The French government collected some of the choicest rams and ewes from Roussillon, where the breed is one of the best in France, and subsequently they obtained sheep from Flanders, England, Morocco, Spain, and even Thibet. A number of these were placed on an extensive farm near Montbar, Bourgogne, the favourite residence

of the great naturalist Buffon, and the birth-place of Daubenton. This particular district is somewhat mountainous. It was therefore considered by Daubenton as the better fitted for the production of fine wool. No cots or stables were erected for them, but they were kept in the open air throughout the whole year, and succeeded astonishingly. In the course of time they spread over different parts of France, intermingling with the original breeds, which, under proper care and with certain precautions, always produced improvement.

Thus encouraged, the French government in 1786 purchased 1,376 ewes and lambs in Spain. These were sent to the royal farm at Rambouillet, an establishment devoted to the improvement of domestic animals. At first, from various accidents and a cutaneous disease little known in our island, considerable loss was experienced. Nevertheless, the flock gradually increased, so that in 1796 a portion of it was sold by government for the benefit of the country. The average weight of the fleece in the yolk was then about 6 lbs. 9 oz., and the average price of the fleece five francs. The rams sold at an average for 71 francs each, and the ewes for 107 francs; the highest price at which a single sheep sold was 200 francs. Five years afterwards the flock had improved in the weight and quality of the wool, and had besides risen in public estimation. The fleece now averaged 9 lbs., and its price was 28 francs. The rams sold on an average for 412 francs each, and the ewes for 236 francs; the highest price given for a single sheep was 630 francs.

According to rigorous comparisons instituted, it was found that the superfine wools obtained from the pure breed produced cloths in every respect equal to those manufactured from the refina or prima wool of the best Spanish races, and that the wool of mixed breeds, after the fourth or fifth cross, was equal to superfine Spanish wool.

Two other farms for the rearing of Merino sheep were now established—one at Pompadour, in the department of the Corrèze; and another at Perpignan, in Roussillon, at the foot of the Pyrenees.

The Directory of the French republic being desirous of extending the improvement still farther, resolved to import annually from Spain one hundred rams and one thousand ewes of the pure Merino stock, for the space of five years, and a stipulation on the subject formed part of the treaty of Bâle. The design, however, was frustrated by the course of political events—Spain repented of the licence given, so that only about 2,000 rams and ewes reached France. At a later period, when Napoleon took possession of Spain, some Merino flocks were amongst the plunder sent to France.

Notwithstanding the fair promise of the early efforts in the naturalization and extension of the Merino breed, these sheep can scarcely be said to have established themselves in France, and would appear, if we are to credit Mr. Trimmer's account, to have in some points degenerated. He visited the Rambouillet flock in 1827. "The sheep in size," he says, "are certainly the largest pure Merinos I have ever seen. The wool is of various qualities, many sheep carrying very fine fleeces, others middling, and some rather indifferent; but the whole is much improved from the quality of the original Spanish Merinos. In carcase and appearance I hesitate not to say they are the most unsightly flock of the kind I have ever met with. The Spaniards entertain an opinion that a looseness of skin on the throat and on other parts contributes to the increase of fleece. This system the French have so much enlarged on, that they have produced in this flock individuals with dewlaps almost down to the knees, and folds of skin on the neck like frills, covering nearly the head. Several of these animals seem to possess pelts of such looseness and size that one skin would nearly hold the carcasses of two such sheep. The pelts are particularly thick, which is unusual in the Merino sheep. The rams' fleeces were stated at 14, and the ewes at 10 lbs. in the grease. By washing they would be reduced half, thus giving 7 and 5 lbs. each."

With respect to the limited spread of the Merinos in France, we are informed that, when an account was taken of the number of sheep in 1811, twenty-five years after the establishment of the flock at Rambouillet, there were thirty millions of the native breeds, and only two hundred thousand pure Merinos. This fact may arise from two causes—first, the ignorance, indifference, or obstinacy of the farmers; secondly, the Merino not being generally adapted for the improvement of the wool of the French races taken as a whole. For the latter cause we have the authority of Mr. Youatt. The French wools generally, he states, are coarse and long, requiring a different source of improvement, a different kind of wool, in order to perfect the manufacture of serges, and stuffs, and bombazines, and, what is the principal object, to enable the native wool of France to be extensively used in the manufacture of these goods. "It is singular that this point of paramount importance should have been so long overlooked; it is to be traced to that mutual jealousy and alienation which have much too long existed between France and England."

We trust that all future rivalry between these two great nations will be solely as to predominance in science, arts, commerce, and the diffusion of the blessings of civilisation.

Since the peace, when the mutual benefits which might accrue to France and England from a

cordial league between the two countries began to be appreciated, and when France, no longer exhausting her resources both of men and money in gigantic wars, bade commerce revive, she received vast quantities of long wool from England. But soon the wish naturally arose to render herself less dependent on a foreign supply, and consequently to establish in France a pure long-woolled breed, which in due time would meet the demand of the manufacturers. Competent persons were sent to England to study our treatment of the Leicesters, and to make large purchases. The success however of the experiment was doubtful; many were swept off by disease, the consequence either of unsuitable pastures or some mismanagement; nevertheless a few breeders were more successful, and maintained a pure flock. France had recourse again to England, and in October, 1833, M. Yvart purchased 12 rams and 110 ewes of Bakewell's Leicesters. These were taken to France *via* Havre, and succeeded well. They were placed upon a farm at Maison Alfort, and in March, 1835, had increased to about three hundred, although they had suffered from a general epidemic disease which had destroyed sheep of all breeds. They maintained their fleece in all its length, soundness, and lustre; they preserved their quiet habits, they were less difficult in the choice of their food even than the native sheep; they fattened rapidly, and their meat was the theme of admiration for its superior quality. The Viscomte Debonnaire de Gif (in the *Ann. de l'Agricult. Franc.*, vol. xv.) remarks that the question of the naturalization of the English long-woolled sheep in France is now determined in the affirmative; so that without neglecting the cultivation of the Merinos, which during the last forty years have done so much for France, there is now another breed equally worthy of care. The Leicesters, occupying the place of the ordinary breeds of sheep, where a good supply of food may be constantly calculated on, will yield to the breeder by their wool, and yet more by their flesh, a recompense fully equal to that which the Merinos would give, and thus exert a propitious influence on the prosperity of the agricultural and manufacturing industry of France. And here it may not be out of place, though we leave the history of the Merinos for a short time, to take a rapid review of the principal breeds of sheep indigenous to France; and of which we find little or no notice in the works of Buffon, Cuvier, Desmarest, and other French naturalists, who are intent rather upon systems, the characters of genera, and the distinctive marks of species, than upon varieties produced by human culture.

We have already mentioned the sheep of Roussillon. They are of a fine short-woolled breed, the fleece having a yellowish or fawn-

coloured tint, apt to hang in somewhat detached locks, but with the fibres beautifully curled. This sheep, inhabiting the borders of Spain, may originally have been established by offsets from the Spanish sheep, and has certainly been improved by abundant crossings with the pure Merinos. In the High Pyrenees a different but still a short-woolled breed is found, with black limbs and face, and also with horns. In the Lower Pyrenees the breed in some points resembles that of Roussillon; the wool is tolerably fine, white at the roots, but fawn-coloured at the extremity of the fibres. During the winter the flocks are kept housed in cotes; but when in spring the snows melt and the fresh grass shoots up, they are turned out to graze during the day, and every evening are collected into a simple uncovered fold guarded by huge Pyrenean dogs, and adjacent to the rude huts of the shepherds, who are ready to give assistance should the wolf or the bear approach the enclosure. In Bearn and la Basse Navarre the mountain breeds have short and fine wool, but intermixed with coarse hair; there are however materials for improvement.

Passing from Roussillon into Languedoc, a fine-woolled race, differing little from that of the former province, presents itself. Crosses with the Merino produce admirable fleeces, especially in the neighbourhood of Beziers; but the intermixture of the Spanish, though it improves the wool, deteriorates both the contour of the sheep and the goodness of the flesh.

Passing the Rhone we enter Provence, a province noted for its sheep, which, like the Merinos of Spain, are fed on the lowlands in winter and on the Alps in summer. At Arles we come to a sandy stony plain, or rather gentle declivity, about nine miles in breadth and eighteen in length, extending from the mountains to the sea coast. This district is called la Crau; it is destitute of trees and stagnant water, but produces certain grass, clover, thyme, and other aromatic herbs, which suit a barren stony soil. On this declivity, sterile as it is, numerous herds are depastured during the winter, and a few perhaps even during the summer. In addition to their ordinary fare, which is well adapted for sheep, they are freely supplied with salt, and are healthy and hardy, requiring but little protection from the weather. These sheep are remarkable for their fine wool. A similar but somewhat larger breed prevails in the Camargue and plain du Bourg, two districts also of Arles. These districts abound in saline shrubs, as salt-wort, glass-wort, &c., which are always found favourable to sheep. Both the sheep of these latter districts and those of la Crau are migratory. On the approach of spring, or rather in May, they are collected and driven towards the Alps which divide Provence and

Dauphiné from Italy, their course being directed for the most part to the hills adjacent to Barcelonnette and Gap (Hautes Alpes); in November they return to their winter quarters. This migration, though occupying not more than half the time consumed by the Spanish sheep, is conducted upon the same principles; it is sanctioned by ancient custom, and regulated by laws. The flocks, the property of several proprietors, consist of from 10,000 to 14,000 each; a road of thirty-six feet in breadth is allowed for their passage, and three shepherds, each having a dog, are placed over every thousand sheep. A troop of asses carries provisions and baggage. An experienced shepherd is chosen from amongst the rest to direct the movements of the flock, and carry the purse for defraying the necessary expenses on the road. He travels in the centre, and thence issues his orders; he regulates the daily allowance of provisions; judges between the farmers and the shepherds in cases of complaint on either side (as the latter sometimes commit trespasses), and sees that justice is done. The journey usually lasts from twenty to thirty days; the sheep are headed by goats trained for the purpose, which carry bells round their necks. Under such admirable controul are these animals (the goats) that they halt or proceed at the command of the shepherd; and at the close of each day's march come into the centre of the flock, and in the morning wait for orders to repair to their station at the head of the troop and continue the journey. Should a stream obstruct the route, they halt till the word of command is given, and then at once plunge in and swim across, followed by the rest of the flock.

When the sheep arrive at the mountains, each shepherd has an appointed boundary beyond which he must not transgress, and the proprietors of the pasture grounds are paid about 20 sous per sheep for their summer pasturage.

These shepherds, like those of Spain, are a peculiar race; they sleep in the midst of their flocks, in the open air, and subsist chiefly on bread and goats' milk.

If our reader refers to the account we have given of the migratory system pursued in Spain, and in the Abruzzi of the Neapolitan state, he will find that, as far as may be reasonably expected, similar circumstances, in these several places, relative both to climate and pasturage obtain. Winter plains or flats, summer mountains; a migration, like that of the swallow, up to the hills in spring, down to the vales in autumn—a migration sanctioned by ancient custom, begun perhaps because it was necessary (more so than at present) for the preservation of large flocks of valuable sheep, and continued, partly because the same necessity still rules, partly because old customs are not to be easily abrogated—nay, not at all, except

under a new modification of a thousand collateral circumstances. We again repeat it, that we do not believe that the superiority of the migratory flocks in any country is owing to the Mesta system; but we suspect that were we sheep owners in Spain, in the Abruzzi, or in Provence, we should find it our interest to continue the same routine. In all countries, habits, manners, and customs are modelled according to soil, productions, temperature, and other contingencies; and because the migratory system is not pursued in England (albeit it is in a restricted and modified sense), we must not *therefore* deem it a bad system in countries presenting a different geognostical aspect.

In Gascony and Guienne there are good breeds of short-woolled sheep; but besides these, other races of inferior quality are to be seen, and the same remark applies to the immediately adjoining provinces. Many sheep are fed in Orléannois, Lyonois, &c. and also in Burgundy and Franche Compté. In Picardy, Normandy, Brittany, we find sheep of various breeds, some of them handsome and of large size, and affording long wool for the best serge manufactories, as those of Valognes and other places.

Taken altogether however France is not a great sheep country; the division of land into small portions held by distinct proprietors militates against the increase of flocks, and in many other respects operates unfavourably.

It is from the central and northern districts chiefly that Paris is supplied with sheep. The South of France is more devoted to the growth of fine wool than to the rearing of sheep for the butcher. Mr. Youatt states that the first sheep which arrive in Paris after the expiration of Lent are from Flanders and Artois, and they continue until the end of May. There is a large supply from Brabant in May and June, and many come from Maine and La Perche from the end of May to October. The Alençon sheep, and those from Bourbonnois and Poitou, occupy the market at the same time. Sheep in good condition arrive from Berri in June, and continue till the end of October. Great numbers are brought from Hainault and Normandy towards the end of July, but the numbers decrease gradually to the end of October. Sheep arrive from the forest of Ardennes from July to December, and from Touraine, Gravelines, Liege, Brabant, Compeigne, and occasionally from Swabia, during the autumn. The Beauceron sheep that have grazed in Brie, Hurepoix, and Beauce, principally furnish the capital with mutton from the latter part of the autumn to the middle of winter; while from January to Lent the Picardy and Santerre sheep are killed, and those that are fattened in the neighbourhood of Beauvais.

“In addition to these the graziers of Lorraine

go to Germany, and buy lean sheep at Aix, Hanover, Paderborne, Veteraue, and Valdeck, which they fatten for the Paris markets. Burgundy also sends a few sheep from time to time, and likewise small flocks come from Hainault and Artois, independent of those that are sent in July. Paris draws one-third of its supply of sheep from the country within thirty miles around it; one-third from Ardennes, Alsace, Lorraine, and the German States, to which the graziers of Lorraine travel, and the remaining one-third from the districts already mentioned. All these animals come to the markets of Sceaux or Poissy, where they pay a toll, and no sheep must be bought by the butchers without a passport from these places.”

To return to the Merino sheep, the naturalization of which has been attempted on a greater or less scale by every civilised country of Europe. It may be observed that England was late in her endeavours to naturalize the Merino, or to seek by its means the improvement of our home-grown fleeces. This tardiness arose from the excellence of the breeds which she already possessed, and of which she was proud, not without reason, for English wool had been for ages the staple commodity of the nation. Her combing wool was unrivalled, her clothing wool was excellent, and the meat of the sheep was as good as the fleece. On these points prejudice took her stand; the Merinos, it was asserted, were not wanted; they would not improve any of our breeds, or if they did as far as concerned the wool, they would render the mutton of very inferior quality. It was contended that the Merinos would degenerate for want of Spanish climate, Spanish pasturage, and the long periodical journeys to which they were accustomed in their own country. To appeal to the success which had accompanied their introduction into Germany, Sweden, Denmark, and other countries, was in vain. Men who will not be convinced, care nothing for any weight of evidence, or any force of argument. All however were not deaf to the voice of reason; there were some who clearly saw the advantages which would follow the introduction of the Spanish sheep, and among these was the late Sir Joseph Banks, so eminent as a philosophic naturalist. Against the popular prejudice his voice was raised, and he convinced his majesty George III., a zealous agriculturist, that it was utterly unfounded. Consequently the king determined to give the Merinos a fair trial on one of his own farms, and in 1787 imported a small flock, which was landed at Portsmouth, and sent thence to Kew. Unfortunately the flock was hastily got together from various districts, and consequently was not uniform as to breed; nor were there any among them of first-rate excellence. They were collected in Estremadura, and as their shipment, without express permission from the

King of Spain, could not take place at any Spanish port, they were driven through Portugal to Lisbon. Thus disappointed, his majesty determined to make application to the Spanish monarch for permission to select some of the best sheep of migratory Merino breeds, and bring them direct from Spain. Among these were five rams and thirty-five ewes, presented by the Marchioness del Campo di Alange from her own flock, one of the best in Spain, of the Negretti race. They arrived in 1791. His majesty sent the marchioness in return eight fine English coach horses. At first, from some oversight as to food or situation, the pasturage being too luxuriant and too damp, foot-rot and liver-rot broke out among the Merinos and sadly thinned their numbers. This accident of course confirmed the prejudice against them; their unsuitableness for our climate was thought to be demonstrated. However upon a change of pasture the further spread of disease was checked, and they got well through the winter; nor did their change of country and mode of treatment affect the quality of their wool; it was equal to the best samples of imported Spanish, both as to fineness and felting properties. Still it was not generally appreciated; while the gaunt, unthrifty form of the sheep, their deficiency of carcase, their want of contour, formed a subject upon which the grazier expatiated in no measured terms of censure. Indeed Sir Joseph Banks declares, "It was impossible to find a purchaser willing to give even a moderate price for the sheep or their wool. The shape of the sheep did not please the graziers, and the wool-staplers were utterly unable to judge of the merit of the wool, it being an article so many times finer and of more value than anything of the kind that had ever before passed through their hands." The fact is that their wool was too fine for most of the manufactures at that period in request.* Since then however things have greatly altered, and the finest wool, whether Anglo-merino, Saxo-merino, or Australian, is now in requisition.

Still the Merinos had their advocates: besides

* Mr. George Culley tells us that the manufacturers would not offer a price for the wool "in any degree equal to what they themselves gave for good Spanish wool, lest it should not prove in manufacture so valuable as its appearance promised. Consequently it became necessary to manufacture the wool at his majesty's own expense, in order to demonstrate its fitness for the fabric of broad-cloth. This was accordingly done for several successive years in various manners, and the cloth uniformly proved of an excellent quality. The persons however to whom the wool was thus offered for sale still continued to undervalue it, in consequence of a prepossession that although it might not at first degenerate, yet its quality would at length become much dereriated. In 1796 it was resolved to sell the wool at the price which should be offered for it, even though such price should be inadequate to its real value, in order that the manufacturers themselves might make a fair trial of its quality. The clip or produce of that year's shearing was accordingly sold for 2s. per pound, and the clip of 1797 for 2s. 2d." In a little time however, when its real excellence had been tested, the wool of these sheep rose in price; the produce of the years 1798 and 1799 sold at 6s. and 5s. 6d. per pound, after washing. Subsequently, the prime wool sold for 6s. 6d. and 6s. 9d. per pound.

Sir Joseph Banks, we may mention Mr. Bartley, Mr. Tollet, Dr. Parry, Mr. Hose of Melton Mowbray, Mr. Bakewell, Lord Somerville, and several others, who appreciated the importance of the breed, and prosecuted their experiments upon it with energy. They perceived that no attention had been paid in Spain to form; they judged rightly that inferiority or deformity of shape was not essential to the production of good wool, and they saw no reason why improvement should not be attempted.

Mr. Bartley crossed Wiltshire ewes with the Merino rams; after a few crossings the ewes became hornless; the form was greatly improved; the wool was little inferior to that of the pure Spanish, and was increased from three pounds and a-half to nearly six pounds per fleece.

Mr. Tollet made choice of the Ryelands to cross with the Merinos, selecting those that carried the best clothing wool. His mixed breed proved very excellent; the weight of the fleece increased from two to three pounds; and the wool rose in value from 2s. to 3s. per pound.

Dr. Parry, of Bath, began his experiments with the Morfe Common sheep—a breed of Shropshire, noted for the fineness of their wool; soon however, for good reasons, he discarded the Morfe ewes, and selected ewes from the pure Ryeland or Herefordshire breed, which were uncontaminated by intermixture with any of the larger kinds. The rams were from his majesty's Merino flock, and from that of Lord Somerville, then president of the Board of Agriculture. The extent of land occupied by Dr. Parry scarcely amounted to sixty acres; the largest enclosure was fourteen and a-half acres, the others varied from three to nine acres. Nearly the whole of the land was much exposed to the sun and weather, and the sheep were disposed upon it at different seasons merely with reference to their security and food, and the dryness of the soil. No particular care was taken of them during the winter, nor were any of them ever housed, except the ewes for two or three nights after lambing, if the weather proved severe. The land was successively manured with stable dung, coal ashes, and other soil, and also by folding the sheep. The greater part produced good crops of grass. In the spring and summer of 1799, when Dr. Parry published his *Facts and Observations* (4to., 1800), the sheep were principally supported on wild endive and cabbages; in the autumn they had Scotch cabbages and hay; and also in the winter and spring, with the addition of ground oilcake. As far as the fourth generation all the rams proved to be horned, but the ewes were uniformly hornless. Such were the principles on which Dr. Parry acted; he produced wool equal to that of the finest pure Merinos, from which first-rate cloth was manufactured. Cloths manu-

factured from prime Leonessa wool and Dr. Parry's wool were numbered and submitted to the inspection of several manufacturers and drapers, who unanimously decided in favour of the number which Dr. Parry's Anglo-merino bore. A committee of the Bath and West of England Society expressed their opinion that Dr. Parry "had by his zeal, diligence, perseverance, and activity, accomplished the grand object of producing in the British climate, and from British soil, wool equal to that usually imported from Spain; and that by so doing he had merited the warmest thanks of the country in general, and of that society in particular."—*Bath Papers*, ii., p. 160. Not only did the Anglo-merino sheep bred by Dr. Parry equal and in some respects excel the pure Merinos in their wool, but they exhibited a surprising improvement in form, though this was not directly aimed at; and he exhibited to the Bath Society several sheep and lambs which had been fed only on grass, in order to prove that by a proper selection the breed might be made to equal in carcase the best Southdowns. We need not say that the Merino wool, and that of Dr. Parry's cross, comes under the head of short wools. But Dr. Parry in the *Bath Papers* observes, that "should long wool of this degree of fineness be wanted for shawls or any other manufactures which cannot be perfected with any common coarse long wools, the ram's fleece numbered 23 in the specimen of cloth will prove that this can be effected by allowing the fleece to remain on the animal *unshorn for two years*." This continuous growth of the wool of the Merino and half-bred Merino, beyond the period in ordinary sheep, is very remarkable. Several experiments on the point have been tried at the French government farm at Rambouillet. A ewe of eighteen months old was left unshorn; the following season she was clipped: her fleece weighed 14 lbs. 10 oz., and its pile was *double* the usual length. Another ewe was shorn at thirty months old, gave a still greater quantity, though she was then suckling a lamb: her fleece weighed 21 lbs., and the pile was eight inches long. In 1800 eight ewes, whose fleeces were of two years' growth, weighed from 16 lbs. to 20 lbs. each. Thus then has it been proved that the Merino wool of two years' growth doubles its length, while it preserves all its fine qualities; nor does the health of the sheep appear to suffer in consequence. Speaking on the subject (*Facts and Observations on Wool*) Lord Somerville remarks that this singular property in the Merino fleece may give rise to some new manufacture in which length and fine quality of pile are requisite; but the hazard of the blow-fly, and the chance of losing in hedges and brakes any part of the fleece when it is once fit for manufacture, will tend to prevent the practice from becoming general; for admitting that the sheep

suffer nothing during the summer months from the weight of the fleece, which is not sufficiently tested, and that the wool would pay as well for growing to this length as when shorn in the ordinary course, the hazard of its being spoiled is very considerable.

Dr. Parry recommends June as the best time for shearing his sheep, and gives preference to the circular clipping now generally practised as the most saving method to the fine Spanish wool. He advocates the Spanish practice of shearing the sheep *unwashed*. It is difficult to make water penetrate through the fleeces of the fine-woolled sheep, and when once thoroughly soaked the fleece is extremely long in drying. This practice indeed, often fatal, may succeed in cleansing the loose dry and harsh English fleeces, but utterly fails with respect to the compact Spanish fleece, the pile of which is so close and the whole so saturated with yolk. Such a fleece once thoroughly wetted will not readily dry, and the sheep are thereby endangered. It is true that the Germans, as we have said, wash and rewash the Merinos by swimming them in deep pits, and afterwards house them; but, with Dr. Parry, we doubt the advantage of the plan; indeed this scientific and spirited breeder affirms that the wool is far less liable to the moth, and scours by the clothier much better in the yolk, than when it has been previously washed. The Spanish shepherds never wash their sheep, but sweat them in long narrow huts, where they remain huddled together the night before shearing; by this mode the fleece is softened.

The merits of Dr. Parry's sheep at length began to excite general admiration. Mr. Bartley, in the *Agricultural Magazine* (Nov. 1804), thus speaks of them:—"They produce wool in a much greater quantity than any species of British sheep, from equal quantities of pasture and equal feed. Far from the slightest appearance of deterioration, they manifest indubitable evidence of general progressive improvement, especially in the quality and value of the fleece. They possess an aptitude to fatten at an early period, and the quality of the mutton is excellent. They resist the effect of cold or inclement weather to a degree equal at least to the hardiest of our native breeds, being defended by a closer, heavier, and more impervious covering. They produce short wools in no way inferior to that imported from Spain, and a single cross will considerably increase the weight of the fleece of our long-woolled sheep, still retaining the suitable staple as combing wool."

In this sketch of the early attempts to establish the Merinos in our country, the efforts of Lord Somerville ought not to be overlooked. He undertook a voyage to Portugal in order to select from the best Spanish flocks such sheep as united superiority of wool to the advantages of as good a carcase as possible. Nor was this his only object; he

was desirous of acquiring a knowledge of the whole system of sheep husbandry as practised by the Spanish shepherds, and in this he experienced the greater difficulty, in consequence of the hostile position which then existed between Spain and England, combined with various other circumstances which need not be detailed. Success, however, crowned his efforts, and in the year 1801 he brought to England a chosen flock of the first quality, selected from the best Transhumantes, and which were the admiration of the Spanish shepherds themselves as they saw them pass along on their journey.

On their first importation, as Lord Somerville avows, "there was great deficiency of milk in the ewes, as well as a tendency to barrenness, which is now ascertained to have arisen from the severe journeys to which this race of sheep is twice in the year subjected when in Spain." (Here then the Mesta system of Spain is at fault.) "They are now regular in their time of lambing, their udders are full, and they are as good nurses as any sheep I have ever seen. It was not until some years after their arrival in this country, when they had become enured to the climate, that any instance of double lambs occurred; now it is not an unfrequent occurrence."

Lord Somerville crossed his rams with ewes of the Southdown and Ryeland breeds with considerable success, especially in the case of the latter; and from this intermixture obtained sheep valuable both for fleece and carcase. He received large sums for his spare stock, and was complimented by several honorary premiums from the Bath Society.

The good opinion which now began to prevail respecting the Merinos, led to a sale of a portion of his majesty's flock of Negretti Merinos, which occurred in 1804. This sale was well attended, especially by the advocates of the Merinos, and indeed by others who entertained no prejudice either adverse to or in favour of these sheep, and many became purchasers. The rams sold at an average price of £19 14s.; the ewes, £8 15s. 6d. each. One of the rams, however, was bought for 42 guineas, and two ewes for 11 guineas each. Such was the difference which thirteen years had made in public opinion.

In 1805 a second sale took place. At this sale seventeen rams and twenty-one ewes were sold for £1,148 14s., being at the average of rather more than £30 each.

In 1808 the highest price for which a chosen ram sold amounted to £74 14s., but the average price was £33 10s. for rams, and £23 12s. 6d. for ewes.

Now came the day of triumph for the advocates of the Merinos. All interested in the subject were elated with anticipations of the most brilliant

prospects; and had a cautious system been adopted, with a clear perception that the wool-grower's sheep and the grazier's sheep are not likely to equal each other in their respective points of excellence, and that a doubt still hung over the capabilities of the Merino to meet the expectations of the latter, the happiest results might have come to pass. As we have said, the Merinos were now in the zenith of their fame; and it must be confessed, that as far as regards their wool, both for weight, closeness, and fineness of staple, they merited their exaltation. In these points they improved every breed with which they were crossed, but generally with more or less deterioration of carcase. Of the estimation in which they were held, some idea may be formed from the sale of 1810. At this sale (*Agr. Mag.*, 1810) thirty-three rams sold for £1,920 9s.—that is, for more than £58 each on an average. Colonel Searle gave 173 guineas for one full-mouthed Negretti ram, and Sir Home Popham 134 guineas for another. A ram of the same strain was sold to Mr. Gale for 116 guineas, and a ram to Mr. Sumner for 105 guineas. Mr. Wools purchased another for 101 guineas.

Nor was the sale of the ewes less successful: 92, 70, 65, 61, and 60 guineas were given respectively for them, and happy was he who, in the midst of a heavy competition, could bear away his prize.

The triumph of the Merinos was complete. A Merino Society was established, of which Sir Joseph Banks was the president; among its members were enumerated the noblest and the wealthiest agriculturists of the country, and local committees were appointed in various counties of England, Wales, Scotland, and even Ireland. Premiums of varying value, from 20 guineas to 10 guineas, were offered for exhibitions of Merinos and cross-breeds, under certain conditions; and all seemed propitious. It was at this very juncture that the Merinos began to lose ground in the estimation of the farmer. In England, sheep are fed not only for wool but for flesh, and in the latter instance, early maturity, a general propensity to fatten, a perfect carcase, on which the fat is laid most advantageously, and smallness of bone in proportion to flesh, are the great desiderata. Many advocates of the Merinos, indeed, insisted that these were among their good qualities. Mr. Trimmer regarded them as equal to the Southdowns in disposition to fatten, and in the excellence of the mutton; and Mr. Webb Hall states, that they afford the finest mutton in the world when made fat; but Mr. Ellman could not fatten one Merino where he could fatten three Southdowns, and found that no graziers would buy them in a lean state. The fact is, that as wool-bearing sheep the Merinos are admirable; and in countries

where the farmer looks only to his fleece as the source of his profit, and not to his mutton, he will do well to cultivate the Merinos. Such however is not the case in our country, where the farmer expects to feed off his sheep early and profitably for the market; and this with flocks of Merinos, it must be confessed, is a thing out of the question.

Another circumstance, and not less influential, according to Mr. Youatt, is this—"The establishment of the Spanish sheep in other countries, and the additional quantity of their wool that is grown, have produced a revolution in the cloth manufacture. Those fabrics with which our ancestors were content are no longer articles of extensive commerce—they are no longer worn; and the wools of which they were composed are devoted to other purposes, and those so numerous and important, that there is in fact a greater demand for British short wool now than there was previous to the introduction of the Merino sheep—a greater demand than the growers of short wool are able to supply. The short wool having now lengthened in the staple so much as to have acquired a new name (middle wool), and having also increased in quantity and weight on the sheep, and the finer grown wool being now to be purchased at a cheaper rate than it could be grown, it would be bad policy in the farmer to alter materially the character of the wool, for its greater quantity, added to a heavier carcase, will produce on the whole a more certain and better remuneration than a finer but lighter fleece, accompanied by a lighter carcase, could possibly give him."

Thus then, as the most extensive experiments with the Merinos were in operation, their sun suddenly went down, and has never since brightly beamed above the horizon. Against opposition the Merinos rose gradually to celebrity; having attained their altitude they rapidly declined. From one extreme in public opinion they passed to another, but as we think unjustly, for, as we have said, it is not with every breed they were calculated to intermix profitably, and in the eager desire for the improvement of wool the interests of the grazier were too much overlooked. We are strongly inclined to believe that a judicious cross with the Merino, as far as certain breeds of English sheep are concerned, might have been and might now be advantageous; we confess that Mr. Plint's reasoning is against us. He says, "I always thought the speculation of cultivating and shearing a decidedly foolish and unprofitable one. We can consume all the coarse wool we grow, and more if we could get it; and taking carcase and weight of wool together, the *long-woolled* sheep is more profitable by far than the Anglo-merino. Besides, if the English breeds were to any considerable extent superseded by the Merinos, the price of that wool (Merino) would fall, and long wools would

rise, and the advantage of growing fine wool on account of its high price would slip through the fingers of the agriculturist. If we could grow more wool of both kinds, well and good, but in present circumstances a profit by foreign wool is as good as a profit by fine (home-grown) wool, and we can only have one, and it is the part of wisdom to take that which is easiest got."

We ought to pay deference to the opinions of gentlemen of such practical knowledge as Mr. Plint; but we would here ask why should the short-woolled Merino take the place of the long-woolled sheep? Surely if a demand for fine short wool and long wool exists, at the same time the cultivation of both races of sheep would go on simultaneously, according to soil and situation, and they could never trespass upon each others' premises; and it is with certain breeds only, more particularly the Ryelands, that a cross with the Merinos would be ultimately successful. On the contrary, however, should the principles of free trade become fully developed, or should our colonies be enabled to supply us with the fine material at a remunerating price to the purchaser, then the question will assume another aspect, and policy would say, How far is it wise to alter the working of a system which experience proves to be advantageous to all parties?

We may here be allowed to advert to what we cannot but consider an oversight in the first instance, namely the neglect of the Saxo-merinos in the improvement of our native breeds. This sheep differs from the Spanish Merino in roundness of carcase and fineness of bone, with a disposition to lay on fat, inasmuch that while the wool is even superior to the Spanish Merino, form and flesh are not sacrificed to it. Lord Western availed himself of this breed, both in improving his Spanish sheep and in crossing with our native races; and Sir H. Vavasour of Melbourne Hall, near York, a few years ago imported some, with the design of testing their qualities. What the result has been does not clearly appear, but we find no data from which to conclude that any extensive impress has been made on any races of our British sheep.

In Wales and Scotland the Merinos never obtained a fair footing, but great numbers have at different times been introduced into Ireland. We may mention the flock of Messrs. Rowland of Kilkenny, which, from one ram and seven ewes procured in 1810, increased during the next ten years to six hundred. We learn from the *Agricultural Magazine*, 1810, that Sir James Stuart sent over a flock of ten thousand Merinos into Ireland, of which, although many hundreds perished by disease, sufficient numbers remained for the most extensive experiments. However encouraging these might have been at first, they have led to

no definite and permanent results; few if any improvements can be now traced to the influence of the Merinos, but many to the introduction of Southdowns and Leicesters.

We have already alluded to the success of the Merino sheep, after many difficulties, at the Cape of Good Hope. In 1810 the import of wool from the Cape to Great Britain was 28,717 lbs.; in 1837 it was 468,011 lbs.

It is principally to the Merino sheep that the wool of Australia owes its value. The first sheep obtained by the early colonists were chiefly procured from Bengal. They were ungainly, unthrifty, long-legged sheep, with large heads and a narrow chest. Their wool moreover was coarse and mixed with hair, and they had nothing to recommend them; yet even these sheep began to show signs of improvement after a few generations. In the meantime extensive importations of Southdowns and Leicesters produced a decided change, and the crossed breeds acquired roundness of carcase, early maturity, and a tendency to quick fattening. The fleece too was greatly improved; but it was not till long after this period that Australia assumed so important a position among the wool-growing countries. Indeed, in the year 1800 there were not 7,000 sheep in the settlement of New South Wales. About this time the colonists, anxious to try the influence which the Merino would have in the improvement of the fleece, procured a few of this breed from England, and the experiment proved singularly successful. The third or fourth cross of the Merino with the then established breed of the country produced an animal with a fleece equal to that of the Merino in Europe, and the pure Merinos themselves improved in the quality of their wool. The triumph was complete, and from this time the prosperity of the settlement may be dated. It rapidly increased in extent and importance, and the growing of wool for exportation was an object zealously pursued. Captain M'Arthur introduced some Saxo-merino sheep directly from Germany, and his success was equal to his hopes. The finest wool in the colony was that which his breed furnished. It had good length of staple and a peculiar softness, though in extreme delicacy it did not equal the Saxony. Mr. Ebsworth, in his evidence before the House of Lords, says, "The wool of Mr. M'Arthur has made some of the finest cloth ever seen in this country;" and Mr. Donaldson, a wool-merchant, states that "the Australian wools have much improved, and are decidedly preferable to the apparently slender description of German wools. From their superior softness of texture they are better adapted than the other description of wools to mix with the harder staple of the English wools. They have comparatively very peculiar qualities. They have a softness and silkiness about them which when

they are worked into cloth shows itself more distinctly than in the raw material of the same description."

The rapid rise of Australia as a wool-growing country may be appreciated from the following statistical account:—The export of wool from New South Wales in 1810 was 168 lbs.; in 1820 it had increased to 99,415 lbs.; in 1821 it was 175,433 lbs.; in 1822 it was 138,498 lbs.; in 1823 it was 477,261 lbs.; in 1824 it was 382,907 lbs.; in 1825 it was 323,925 lbs.; in 1826 it was 806,302 lbs.; in 1827 it was 320,683 lbs.; in 1828 it was 967,814 lbs.; in 1829 it was 913,322 lbs.; in 1830 it was 973,336 lbs.; in 1831 it was 1,134,134 lbs.; in 1832 the quantity sent from New South Wales and Van Diemen's Land amounted to 2,377,057 lbs.; and in 1833 to 3,516,869 lbs. In 1837 the wool from New South Wales was 4,606,915 lbs., and from Van Diemen's Land, 2,453,610 lbs.

The average market price of wool varies according to circumstances, as the general state of trade, the pressure upon the money market, &c. We may, perhaps, average the best Australian wool at from 3s. to 4s. per pound; inferior sorts sell of course at a lower rate.

Sheep constitute the riches, and sheep farming the chief employment, of the New South Wales colonist. Some of the sheep owners possess flocks of upwards of 20,000 individuals. These are separated into smaller or larger troops, according to the nature of the feeding district, and are placed respectively under the charge of shepherds, often convicts, whose labour and anxiety, if they do their duty, are of no trifling nature. The sheep have to be folded or secured in the sheep-yard every night. Their hours for grazing are from before sunrise to evening, when they have to be collected and counted. The shearing time is one of great bustle and excitement, and the work is generally superintended by the owners. The sheep are washed previously to shearing. The fleeces average from $2\frac{1}{2}$ lbs. to $3\frac{1}{2}$ lbs. each; some, however, have weighed 5 lbs.

New South Wales is subject to severe droughts of no uncommon occurrence. Months elapse without a single shower, and vegetation becomes withered. The country is parched up, it assumes the aspect of a desert. It may be readily imagined to what distress in long droughts such as that of 1826 (which continued for two years with unabated severity) the cattle and flocks must be subjected. At such seasons the rivers and pools are dried up, and numbers of animals perish. The settlers drive their flocks to distant tracts in quest of pasturage, and see them drop by scores. Fearful, indeed, is the calamity occasioned by these droughts, which are generally succeeded by long and excessive rain, which comes on suddenly and pours down in tor-

rents, filling the river-courses and pools till they deluge the country, overwhelming huts, and sweeping off herds of cattle and flocks of sheep to destruction. Gradually the rains decrease, but are continued for ten or twelve years, when they cease altogether, and the drought again commences.

Besides these causes of loss, there are others against which the stock-keeper has to contend. The more interior parts of New South Wales are infested with the wild dingo dog, which often makes sad havoc among the sheep, notwithstanding the utmost vigilance of the shepherd and the powerful dogs by which he is attended. A still more formidable foe is the bush-ranger, or runaway convict, who lives like a wild man, and makes his lair in some remote and concealed spot, whence he issues to plunder the sheep-fold, often to murder the keeper, or commit other aggressions.

Though not subject to many diseases, the sheep of New South Wales are liable to two, which assume an unusual degree of severity, and which, if not taken in time, wear out the suffering animal till it expires. These diseases are the foot-rot and the scab; they are sometimes the cause of extensive losses.

The colonies of South Australia and Swan River need not here detain us; the sheep there cultivated are of the New South Wales breed, and the spread of this breed over such islands of the South Pacific, colonized by Europeans, as will support the sheep, may be naturally anticipated.

We may now glance for a moment at the Spanish sheep in another region of the earth. We refer to South America. In North America, or rather in the United States of Canada, the sheep are of English extraction—Leicesters and others, varying in excellence, many breeds being truly valuable, and yielding excellent meat. When, however, we enter the vast region of South America, we find the sheep are all, or almost all, of Spanish descent. Large flocks are kept in the pampas, or extensive plains, guarded by dogs, who are bred up among the sheep and regarded by the latter as their natural protectors. In general, the South American sheep have degenerated from their original stock. Their wool has lost its fineness, and moreover is more or less mingled with long hairs; still, if not available for fine cloths, it

is useful for articles of coarser texture, as rugs, friezes, and the list edging of broad-cloths. In 1837 the imports of South American wool to the United Kingdom were as follow:—from Brazil, 174 lbs.; from the States of the Rio de la Plata, 2,207,951 lbs.; from Chili, 376,217 lbs.; from Peru, 1,914,751 lbs.; a very few pounds only were sent from Columbia, viz., 42.

In North America the Merino breed has been used, especially in the northern provinces, with decided advantage, and has even extended to Canada. But besides this, fine Leicesters and other British breeds have within the last few years contributed greatly to the improvement of the old coarse-woolled races. Yet even before the more recent attempts at improvement, there were some good kinds of sheep in the United States. Among these we may mention the Arlington Long Wools, originally bred by Washington (at once a soldier, a statesman, and a patriot). This stock descended on the male side from a Parisian ram, and on the female from ewes of Mr. Bakewell's improved Leicester breed. The wool is white, silky, soft, and with a staple of considerable length—that is, from ten to twelve, or sometimes even fourteen inches. It is well adapted for serges, camlets, hose, and similar fabrics.

Mr. Livingston describes (1811) a breed of sheep called "The Otter Sheep" as peculiar to some districts in the States. These sheep are remarkable for the length of their bodies and the extreme shortness and crookedness of their limbs. They can barely hobble along, but are deprived of the power of running, leaping, or any active exercise. The wool is tolerably fine and moderate in length, and the carcase weighs about 15 lbs. the quarter. This breed is evidently an example of hereditary malformation, but we do not know if it be now extant.

Since the improvement of the sheep of North America, the exports of wool, especially from the United States, have greatly increased. In 1837 the British Islands received 237,380 lbs.; and from our Canadian colonies, 4,814 lbs. In the same year, however, the value of woollen manufactures exported from England to the United States amounted altogether to £1,045,279; and to the Canadian colonies, £391,079.

CHAPTER V.

GENERAL OBSERVATIONS ON THE BRITISH SHEEP.

It is now time for us to direct our attention more exclusively to the breeds of sheep which may be justly regarded as peculiar to the British islands. But before we enter into their distinctive peculiarities, a few preliminary observations may not be out of place.

As in the case of the ox, the sheep acquires different names at different periods of its life, and the same names are not alike applicable to both sexes.

The male is usually denominated a *ram* or *tup*. The term *lamb* is applicable to the suckling young of both sexes; but the male, until weaned, is distinguished as a *tup-lamb*, a *ram-lamb*, a *pur-lamb*, or a *heeder*. When weaned, until shorn (supposing him not shorn while a lamb), he is called a *hog*, a *hogget*, a *haggerel*, a *teg*, a *lamb-hog*, or a *tup-hog*; and if castrated, a *wether-hog*. After shearing, say when a year and a-half old, he is called a *shearing* or *shearling*, a *shear-hog*, a *diamond* or *dinmont ram*, or *tup*; and if castrated, a *shearing wether*. *Hogget-wool* is the wool of the first shearing, supposing the *lamb* was not shorn while it retained that title. After the second shearing he is called a *two-shear ram*, *tup*, or *wether*, next a *three-shear ram*, &c., the appellation indicating the number of shearings. In the North of England and in Scotland he is called until his first shearing a *tup-lamb*, then a *tup-hog*, after that a *tup*; or if castrated, a *dinmont* or a *wedder*.

The female, while suckling, is a *ewe-lamb* or *gimmer-lamb*; and when weaned, a *gimmer-hog*, a *ewe-hog*, a *teg*, a *sheeder-ewe*. After the first shearing she is called a *shearing-ewe* or *gimmer*; sometimes a *sheave*, or a *double-toothed ewe*, or *teg*.

Afterwards she is called a two-shear or three-shear, or a *four-tooth*, or a *six-tooth ewe* or *sheave*. In some of the northern districts ewes not in lamb, or that have weaned their lambs, are termed *eild* or *yeld ewes*.

There are besides these other terms, not in general use, but restricted to certain localities, which must be regarded in the sense of provincialisms.

It is a singular fact that the age of a sheep is not calculated from the date of its birth but from its first shearing, though at that time it may be in reality fifteen, sixteen, or seventeen months old. How this custom arose we do not pretend to say, but it is established.

The age of a sheep may be pretty clearly ascertained by its incisor teeth. We need not say that the sheep has no incisor teeth in the upper jaw; it is a ruminating animal, with the same complicated

structure of stomach as we have described in our history of 'The Ox,' and with its dentition upon the same plan as in the latter animal. The palate is marked by elevated transverse ridges, and these, thickening as they approach the fore-part of the mouth, merge into a dense, cartilaginous, and elastic pad of fibrous matter, covering the extremity of the upper jaw, and opposed to the oblique incisors of the lower jaw, which press the herbage against it with sufficient force to cut the tender stalk asunder, or to bruise it so much that a twitch of the head (as we see in sheep when feeding) is sufficient to separate it. The sheep, indeed, half bites, half tears its food, and consequently is perpetually pulling up portions of firm grass by the roots, to which particles of the earth adhere; these it swallows, not only with impunity but advantage, inasmuch as the calcareous matter, which the mould contains in greater or less abundance, tends to neutralize any acid that may form in the paunch from the fermentation of its vegetable contents.

We described the muzzle of the ox as large and naked; in the sheep the muzzle, on the contrary, is small and hairy, and the nostrils are oblique; the upper lip is divided, in order to allow the animal to bite the turf as closely as possible, so that it grazes much closer than the cow, and would live on pasture lands where the latter would starve. Where flocks of sheep feed they render the grass short, thick, and even, giving the turf a velvety surface. Their close cutting of the herbage prevents it from shooting up or becoming rank, and at the same time causes the roots to spread in every direction, and form a more united layer in the soil, so that they throw up fresh and more numerous sproutings in dense array. It is thus that sheep by their close feeding make good pasturage, for after they have eaten down the grass it springs up with renovated vigour, close and even.

In number the incisor teeth of the sheep agree with those of the ox, viz. eight; but they differ in certain points, inasmuch as there is a difference in the manner in which the two animals respectively crop the grass. In the sheep they are expressly formed for close feeding, and for nipping off the wiry stalks close to the roots, or even for nibbling harder food, as the shoots of the heath or broom. Not only are the teeth well covered with hard enamel, but this enamel rises on the edge of the tooth for nearly a quarter of an inch, presenting a convex surface outwardly on a concave surface within, so as to form a sort of gouge or chisel, capable of cutting a tough or wiry substance with

admirable facility, and also of biting off the grass of the pasture grounds from the very root. The sheep may be said to *nibble* the herbage, the ox to graze.

When the lamb is newly born, no incisor teeth are apparent, or only two just showing themselves; but their progress is rapid, and before the month is fairly completed the whole eight have made their appearance, rising up in due succession; still they are not developed to their maximum, for they continue to grow till the *lamb* becomes a *hog*, or in other words, for the space of fourteen or fifteen months. And now begins the wearing and absorbing processes, upon the same plan and routine as that described in 'The Ox,' p. 81, 82, only to a greater degree. The two central teeth are now shed and renewed, and the permanent pair are fully developed when the sheep is two years old from its birth. When between two and three years old, on the same calculation, the next in order on each side of the central pair is shed, and renewed, and completed by the end of the third year; at the age of four years, the next tooth on each side is developed (the milk teeth having been shed), and when the animal has completed its fifth year, all the eight permanent incisors are perfectly developed. The sheep is now said to be full-mouthed.

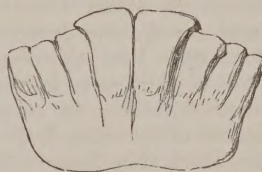
This is the ordinary routine; but let it be remembered that the sheep is a domestic animal, and influenced in the vigour of its constitution by diet, by locality, and the constitution of its parents. In some cases the dentition is retarded, in others accelerated. Mr. Culley in his work on live stock says—"Now respecting the judging of the age of the above animals, viz. horses and neat cattle, by the renewing of their teeth, though perhaps the best rule we know of, yet I cannot think it is always to be depended on. However, in sheep I am very certain we are very liable to be misled by it, and I apprehend much depends upon being *early* or *late* lambed (a most judicious observation), well or ill fed, and so on. Particularly I have frequently known tups to have what we call *four broad* or *renewed* teeth, when by the ordinary rule they ought to have had only two. A friend of mine, and an eminent breeder, Mr. Charge of Cleasby, a few years ago showed me a *shearing tup* (that is, after the first shearing at fifteen or sixteen months old, when he loses the name of *hog*), at Richmond in Yorkshire, for the premium given by the Agricultural Society there, which had *six broad teeth*, in consequence of which the judges rejected Mr. Charge's tup, though confessedly the best sheep, because they believed him to be more than a *shearing*. However, Mr. Charge afterwards proved to the satisfaction of the gentlemen that his tup was no more than a shearing."—(P. 213.)

In examining the teeth of the sheep, the mouth should be fairly opened and the teeth counted, and not left to the glance of the eye alone, however practised, for it often happens that at four years old the mouth is apparently full with broad teeth, no small external corner teeth being visible; but in fact these teeth do exist, but, being small or reduced, are displaced by their neighbour on each side, which starting up before them, prevents their being readily seen. Now unless the teeth are counted and fairly examined, the six visible teeth may be taken for eight, and the animal be estimated at five years of age.

The following cuts show—1, the incisors at the age of about fifteen months; 2, at the age of two years; 3, at the age of three years; 4, at the age of four years; 5, at the age of five years; and 6, the deceptive appearance last described as sometimes occurring in a four year old sheep.



1



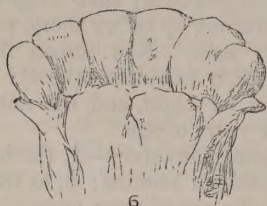
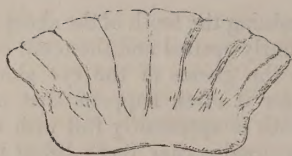
2



3



4



When the mouth of the sheep is completed, it is difficult to judge of the age of the animal afterwards. The teeth wear down at a different ratio on various pasture grounds, and according to different modes of feeding. Often they become broken, at other times they loosen and fall out, not perhaps from age so much as from constitutional predisposition, or delicacy of constitution, or from what is called close feeding on scanty and short pasturage, and sometimes perhaps from the influence of locality. One, two, or three years, according to circumstances, may elapse before the decline and fall of the teeth commence; but when the teeth exhibit these signs of disintegration the sheep has passed its grand climacteric, unless indeed accidental causes have greatly contributed to their destruction. Yet, supposing this to be the case, the loss of incisors to the sheep would in itself be the cause of decline, for on these incisors depends the power of procuring food. In the dog on the contrary, which often loses its small incisors at an early age, as long as the canines and molars are sound their loss is not materially felt.

How long the farmer may deem it necessary to keep a sheep, when, after the sixth or seventh year, its incisors show symptoms of decay, will depend upon many contingencies, and upon motives alien to the common order of affairs; but neither in wool nor in flesh can he expect much remuneration. The average age at which sheep are killed is from two years to four or four and a-half, sometimes five, but after this period their wool begins to decline in value, and they lose much of their tendency to fatten; we are here speaking of ewes, and of these how many come to the butcher at an early age? Quick and early fattening is under many circumstances the farmer's chief profit.

It is very difficult to say what is the natural age of the sheep; and we have no data respecting the wild mouflons or argalis by which to be guided. Perhaps we may estimate the natural

duration of the life of this animal at from twenty to thirty years. Mr. Culley says, "I have heard of particular sheep living to near twenty years old—those which the mountain shepherds call *guide sheep*, viz., old wethers kept to guide and direct the bleating flocks upon those unfrequented wilds. It is not perhaps naturally that the sheep ceases to be productive till late in life. It would appear to be a law among quadrupeds generally, that the failure of the reproductive powers is speedily followed by death; they have accomplished the great purposes of their existence, and must yield up their place to others. Mr. Moore, of Winthorpe, had on his pastures, in 1824, a ewe that yeanned a pair of lambs when she was a *shearling* (fifteen or sixteen months old), and had afterwards *two pairs yearly* for fifteen years; and then, for two more years, single lambs at each yeanning.

We need not dilate upon the skeleton of the sheep. It offers nothing that need particularly detain us, being typical of that of the smaller ruminantia in general. The ribs are thirteen on each side, the dorsal vertebræ being of course of the same number. There are six lumbar vertebræ, and those of the tail vary in different breeds from twelve to twenty-one.

With the skeleton of an animal, its symmetrical proportions are intimately connected. Our various breeds of sheep, however, differ somewhat from each other in external form, and no doubt according distinctions might be traced in the osseous framework. These distinctions would necessarily be confined to a few minor peculiarities, and we are not aware that a comparison of them has been attempted. The form of the skull, the stoutness or slenderness of the bones of the limbs, the flatness or arching of the ribs, the expanse of the sacrum and haunch bones, would offer themselves most prominently to notice. How far such an investigation would be profitable may admit of doubt; the eye of the farmer as he looks upon a sheep requires but little other aid, nor will his experience fail him, albeit he knows nothing, by personal investigation, of anatomical minutiae.

But although the eye of the farmer can at once detect the characteristics of different breeds and fully appreciate them, yet there are certain points which, on every well-bred sheep, he expects to meet with.

With respect to the *Ram*.—His head (as Mr. Culley, no mean judge, asserts) should be fine and small; his nostrils wide and expanded; his eyes prominent or rather bold and daring; his ears thin; his collar full from his breast and shoulders, but tapering gradually all the way to where the neck and head join, which should be very fine and graceful, and perfectly free from any coarse leather hanging down; the shoulders should be broad and full, and at the same time joining so

imperceptibly to the collar forward and the chine backward, as not to leave the least hollow in either place. The muscular development (or mutton, as it is called) upon the arm and fore-thigh must come quite to the knee; the legs should be upright, with a clear fine bone, and from the knee and hough downwards equally clear from superfluous skin and coarse hairy wool; the breast should be broad, and advanced well forward, separating widely between the fore-limbs; the chest should be full and deep, with no falling in behind the shoulders; the back and loins should be straight, flat, and broad; the ribs rising from the spine, with a fine circular arch; the belly should be straight, not bagging; the quarters long and full, well fleshed down to the hough; the houghs should stand parallel, neither in nor out; the twist or junction of the inside of the thighs, wide and proportionate to the distance of the fore-arms, so that the pillars of support accord in due symmetry with each other, well supporting a rounded and developed volume of carcase. The pelt should be moderately thin, and the wool fine, bright, and soft.

The nearer any breed of sheep, says Mr. Culley, comes up to this description, the nearer it approaches towards excellence of form. But Mr. Culley takes the Dishley breed of Leicestershire as his standard; a breed remarkable for its fulness of form, its early maturity, its propensity to fatten, the small proportion of offal, and for returning the most money in proportion to cost of keeping.*

Let us, however, add to this picture the sketch of a few other breeds. We will first take the South-down, which, as far as mutton is concerned, to our taste at least, is almost unrivalled.

The head is small, compact, and hornless; the face of moderate length, and, to use a sculptor's phrase, neatly outlined and chiselled; the lips being thin and definite, and the space between the nostrils narrow but sharp. The face should be dashed with brownish gray; the forehead, the ears, and the space between the ears well covered with wool. The eye should be clear and bright, but not

prominent. The neck should have a graceful *tournaire*, thin at its junction with the head, but enlarging towards the shoulders and chest. The breast should be prominent, wide, and deep. The set-on of the shoulder blades should be oblique, and the ribs should arch boldly, so as to produce a well barrellled carcase. The loin should be broad and flat, the rump long and broad, the tail set-on high, that is on a level with the back, the hips wide, and close up to the last rib on each side. The belly should be well supported and straight, and also covered with wool. The limbs should be far apart, muscular, and full; the shanks clean, fine boned, well knit, and covered with short woolly hair of a rusty gray or brown tint. The fleece should be short, close, fine, curled, and free from kemps or projecting hairs.

Let us next turn to the Cheviot sheep, now improved by crossings with the Leicesters. The head is bare and clean, the ears are rather long, the chaffron is somewhat convex, and the jaws are considerably elongated; the face, formerly dusky, as were also the limbs, is now white. The neck is full and round, the chest open, and the general contour of the body round and full. The legs are clean, and clad with wool to the knee joints and hocks. The fleece is of a medium length, close-set and fine, and should be equal in point of quality on every part; it is, however, apt to be curled about the shoulders, and coarser on the hips, tail, and belly, than elsewhere; but in the improved stocks a great amelioration in these particulars has taken place, and the modern Cheviot assumes an important station among British sheep, and is encroaching on the black-faced sheep of Northumberland, Cumberland, Westmorland, and the hilly districts of Scotland. This black-faced breed is horned, wild-looking, active, and hardy; it has been much improved of late years, the carcase being compact, short, and rounded, and has thus acquired the appellation of the *short sheep*, in contradistinction to the Cheviots, which are called *long sheep*.

Here we may make a few observations with reference to the principles of breeding. The ewe is in a sufficient state of maturity at the age of about fifteen or sixteen months. Formerly, before the improvement of our breeds of sheep, one point of which is their early development, it was not until a far later period that the farmer regarded their constitution as sufficiently established, and he was correct. But now the case is altered, and the ewes may be safely allowed to breed while under two years old (by ordinary calculation).

The sheep farmer has two great objects in view—first, the establishment of a flock early fitted for the market, fattening kindly, fine in the bone, heavy in the flesh, and excellent in the quality of the mutton; secondly, the growth of

* Mr. Robert Smith observes, that "such is the effect of soil and situation, that when animals have been equally divided and kept apart for twelve months upon opposite soils, they have scarcely resembled each other when placed together again, beyond the family head. It is said by some breeders that a good animal should approach the form of a *soda water bottle*; but I prefer the upper and under lines to run parallel with each other, and extend themselves to the very extremity of the animal's frame, but have no objection to the oval sides. It is important that the sheep should display a degree of *grandeur* in its movements, which can alone be accomplished by a proper formation of the general frame; for instance, when the soda water bottle form is adopted, the animal has a thin neck, narrow hind-quarters, wide sides or hanging fore-flanks, and invariably stands upon short fore-legs, consequently it walks with difficulty, and carries its head in a low position. But on the other hand, when the chines or shoulders are well thrown into the back, blended with well sprung top-ribs, long hind-quarter, the flesh or fat laid even or in mass throughout the upper form, the animal stands open and well upon the fore-legs, and consequently becomes *habitually* gay and easy in its carriage."

good saleable wool, according to the breed for which his pastures are fitted. Neither of those two desiderata ought to be overlooked, nor is one to be advanced at the expense of the other, although in the present day the grand object is weight and maturity of carcase; the quality of the wool being regarded in a secondary point of view. We think this to be an error. We acknowledge that the farmer knows what is most to his profit, but he must acknowledge that our home-grown wool has not of late advanced in superiority. The fact is that high feeding, and the system of bringing the sheep to an early maturity, attention being paid to colour, symmetry, and fattening, are inconsistent with the simultaneous improvement of wool. Mr. Bakewell, the originator of the Dishley breed of Leicesters, did not attempt to deny that wool was sacrificed to carcase; the quantity and quality of mutton, obtained at the least expense of food, was his great aim, and he attained it; but he regarded the wool as a matter of little consideration. In other breeds of sheep the same thing is observable. The Western Down sheep once used to return an eighth part in each fleece of the finest wool, but now it is not even separated from the rest, its quantity being so small. The same observation applies to the Southdowns, and also to the Norfolks. Mr. Fison stated in the House of Lords (1828), that in the year 1780 four hundred and twenty pounds of good clothing wool, grown in Norfolk, would produce two hundred pounds of *prime*. In 1828 it would produce no more than fourteen.

The inverse ratio between early forcing and high fattening on the one hand, and the fine quality of the wool on the other, was noticed by Dr. Parry; indeed the ancients were aware of the effect of rich pastures in the deterioration of wool. Virgil says, "*Si tibi lanicium curæ, fuge pabula læta*,"—that is, "if woollen manufacture be your object, avoid rich pastures;" and Columella commends the hungry lands of Parma and Modena as producing sheep most valuable for their fleece; and it is well known that the finest-woolled sheep will maintain themselves in tolerable condition where the coarser-woolled sheep will barely support existence. But then the question is, will not the fine-woolled sheep, placed on an equal position with the coarse-woolled, fatten even more rapidly? and if so, may not sheep be reared for fine wool till a certain age, and then fattened off? It is thus that the Durham and Yorkshire short-horned cattle are treated. They are both milkers and fatteners, but not at the same time; and when the dairyman deems it advisable to discontinue to milk them, he sells them for fattening or fattens them himself. As, then, is it not impossible to breed cattle admirable alike for the pail and the butcher, may not sheep be reared valuable for their fleece, and equally so for their carcase?

Mr. Youatt says, "that since the sheep-breeder living in a populous country has begun, and judiciously so, to look more to the profit he derived from the carcase, since the system of artificial feeding has been brought to so great a perfection, and a larger and better animal has been sent to market earlier, and a far greater number of sheep can now be fed and perfected on the same number of acres, the wool also has been somewhat altered in its character: it has grown in length and increased in bulk of fibre. It has not *deteriorated*, but it has *changed*. If it is no longer fit for the purposes to which it was once devoted, it has become suited to others. If it no longer brings the extravagant price it once did, it meets with a readier sale. The increase of the number of fleeces, and the increase of weight in each fleece, go far to compensate for the diminution of price, while the improvement of the carcase more than supplies the deficiency, if in truth there were any; so that considering the badness of the times and the state of agriculture generally, the sheep is comparatively more valuable to the breeder than it was before."

This is a kind of special pleading which we do not quite understand. It is an admission that the new mode of sheep-husbandry leads to the increase of length and bulk in the fibres of the wool of the sheep; it is therefore less available for fine woollens or for felted stuffs, and, as he confesses, will not sell at the high rate it formerly did. Is it not in fact neglected for other objects? At the Smithfield cattle show, 1846, all the sheep exhibited had their merits determined, not by quality of wool, but by symmetry, early ripeness, and conditions relative to age and feeding. We are not aware that even a sample of wool was exhibited. It may be said, and perhaps justly, that the objects of the Smithfield cattle show are utterly exclusive, and that the milking properties of a cow or the wool of a sheep are not contemplated by the club. Perhaps so; and in as far as this exclusive attention to one point only is directed, we conceive that many evils will arise. Surely fat is not the *summum bonum* of the ox or the sheep, to say nothing of the waste of food in the accomplishment of the great design. No doubt the farmer understands his own interest, and if his plan leads the manufacturer to look not to our own but to foreign breeds for his fine wool, and if the supplies of the latter be sufficient and regular, it may be the best for both parties; but England must cease to boast her pre-eminence in wool.

With respect to the principles of breeding, judicious selection, as in the case of the ox, is requisite; for like produces like. A farmer who breeds at random cannot expect a valuable stock. Let no lamb be kept which presents any defect. This is applicable both to young rams and ewes.

The farmer should keep the *beau ideal* of his breed in mind, and fatten off for the butcher every unthrifty looking lamb. Even while the lambs are at a very early age, he will be able to discriminate among them with considerable certainty; but he ought not to bind himself to one supervision. Let him remember that of rams he will need but few, and these should be the most select of the select, the models of their kind; and if by nice selection he thins the number of ewe lambs intended for breeding, he commits no error, but on the contrary will find his advantage in what might be called over-particularity. If he aims at a high strain, or what may be called blood, he will find no other means efficient. The principle of selection is his sheet-anchor. Bred and reared, generation after generation, on certain pasture lands, the breed becomes as it were identified with the locality, and would most probably degenerate in some points if suddenly removed to a different soil and different climate. Nevertheless, this breeding in-and-in, however first-rate the stock may be, though it may result in the establishment of various excellences, will tend in a short time, perhaps, to the slight reduction of the sheep in size. They will be more tender, more susceptible of the severity of winter, and perhaps more liable to disease. Here the farmer, wisely anticipating the future, will halt. His next care will be a judicious cross, a cross with the same kind of breed, but not his peculiar sort—one which is located at some distance if possible, but on a similar soil, producing the same feed and pasturage. From such a flock he will select his rams, not one of which ought to be inferior to his own in any quality; and in any point in which his rams happen to be somewhat deficient, these ought to excel. With these rams, setting his own aside, he may now interbreed, and the progeny, if his choice has been judicious, will be vigorous, healthy, hardy, and as it were regenerated. Next season he may return to his own rams, perhaps with advantage, but in a few years he will have to repeat a similar cross, the infusion of foreign blood being again necessary. Experience has proved that a pertinacious adherence to one breed, which is neither more nor less than a perseverance in breeding in-and-in, will, however admirable the stock may be, result in its deterioration. On the other hand, incautious crossings are to be especially guarded against. The animals brought together should agree in excellences of every kind. They should be of congenial blood, and they should have attained their perfection, respectively, under similar circumstances relative to pasturage and general treatment.

These principles are equally applicable to sheep of all breeds. They constitute a general rule, and by acting up to it in the spirit of its intention, solid improvement only is to be obtained. But

supposing the object is to raise up from an indifferent breed one possessing many excellences, on what plan is this to be done? We should answer, by repeated judicious intermixtures with breeds possessing general characters, but with every excellence fully developed. Let us put a case in point. The old long-woolled Lincolnshires were a gaunt unsightly race. They yielded abundance of wool, though not of first quality; but its quantity induced the breeders of olden time to put up with every defect. "The Lincolnshire breeders," says Mr. Culley, "can justly boast of clipping the greatest weight of wool from a given number of sheep; but then this very heavy wool seldom or never fails to cover a very coarse-grained carcase of mutton—a kind of mutton well known for its coarse grain and big bones in the London markets, which not only sells for less money by the pound in the metropolis than any other kind of mutton, but in every market in the island wherever it happens to be exposed for sale, and has brought an odium upon large mutton which the best kinds do not deserve. Yet this is not the worst of it; for this kind of sheep cannot be made fat in a reasonable time in any part of the island except Romney Marsh, their own rich marshes in Lincolnshire, or some very rich grazing grounds. Perhaps this is the best reason we can give for a set of sensible men so long adhering to this coarse-grained slow-feeding tribe. Indeed the prodigious weight of wool which is annually shorn from these sheep is an inducement to the Marsh men to give great prices to the breeders for their hogs, or hogrils, as they are there called, where, though they must be kept for two years more before they get them fit for market, yet in the meantime they get three clips of wool from them, which alone pays them well in those rich Marshes."

To this Mr. Culley adds, "An eminent breeder in Lincolnshire has favoured me with the following particulars, in a letter dated January, 1793:—

"The average price of hogs, bought in at Lincoln and Boston fairs is about 26s. per head. If these are kept until *three-shear*, the average weight of the wool will be about 12 lbs. a-fleece; but when they breed their own stocks, and have nearly an equal number of ewes, hogs, and wethers, the average weight of the fleeces is about 9 lbs. Very few (if any) of the Lincolnshire breed are ready for market at *two-shear*; and I am credibly informed that several are under the necessity of wintering some of their *three-shears* before they are marketable. I am just returned from London, where I find the average price of three-year marsh sheep not to exceed 35s. A friend, who buys a great number every Michaelmas of three-year Marsh sheep, to put to turnips in the vicinity of Wakefield and Rotherham, assures me that 35s. is the full average for picking the best lots; and an

extensive farmer near Boston informs me his ewes that missed lamb last year were sold in Smithfield, from August to Michaelmas, at about 21s. round, and that the highest price he got for his three-shear wethers was 36s., and several lots sold under 30s. His flock are considered the best Lincolnshire breed. Some of my neighbours, who have been using rams of the Dishley breed, have sold their *two-year* sheep in May, clipped, for 42s. a-head round; another sold 300 *two-shear* sheep at Michaelmas, in one lot, for 43s. a-head, and left only 26 culls. The average weight of the wool of this flock is 9 lbs. a-fleece."

Here then, a few years since, we had, what we do not see now, a gaunt, large-boned, slow-feeding, late-ripening Lincolnshire breed, heavy only in the fleece, to which at one time the Lincolnshire breeder paid almost exclusive attention. For ages the wool had been celebrated for its value in certain manufactures, and had supplied the looms of Norfolk. There was rivalry between them and the old Leicesters. Still their carcasses would bear, or rather needed, improvement; for the meat found no favour. At length this was perceived by the Lincolnshire breeders, and attempts at crossing were made. Rams of the improved or Dishley Leicesters were procured, and the result proved successful. In the first place, the cross-bred wethers attained to maturity a year earlier than it was accustomed to do, and with far less expense of food; in the second place, the ewe when drafted was sooner ready for the market, weighed much more than formerly, sold more readily, and yielded excellent mutton; in the third place, the fleece lost little weight—perhaps it became rather shorter and finer, with improved colour, and wanted its old original toughness, a quality of first importance in combing wools. To bring back length and toughness of staple without the old coarseness, while improved form, an aptitude to early ripeness, and better quality of flesh are retained, is still a desideratum; for, as we have said, the great rage is now for sheep of carcase, not for sheep of wool. However, this is nothing to the purpose here. We have, to illustrate our argument, cited a case in point, taking as the faults of the sheep to be amended, long legs, large bones, insufficiency of mutton, inferiority of mutton, and slow maturity; and we have seen how efficiently a judicious cross has ameliorated all these defects. On the other hand, were it politic or desirable to sacrifice flesh, form, and early ripeness to wool, selections on a similar plan, but in an opposite course, would produce parallel effects, only on the contrary side.

The time in which the ewe should bring forth her lamb is a point which we may here notice. Generally speaking, the new-dropped lambs whiten the fields when the snows of winter have passed

away, when the fresh grass begins to spring, and when the cold in sheltered spots is not too severe for the new-born young; in other words, the lambing time averages from February to the middle of April, according to situation and temperature. When lambs are dropped early, while the weather is bleak and the winds piercing, numbers of them are sure to be cut off as soon as weaned, to the great loss of the farmer; yet, on the other hand, late lambs are tender, and less able to resist the cold of the ensuing winter than those dropped in March, while, at the same time, warm or sultry weather militates against the health and recovery of the mother after lambing, and is apt to induce febrile diseases, not devoid of great danger. The London markets are supplied alike by early and by late lambs—indeed, lamb is in the market from Christmas till autumn; but late lamb is not equal, *cæteris paribus*, to spring lamb. As to the precise month, or time of the month, in which the farmer should prepare his ewes to wean, much will depend on locality, the nature of the pasturage, his purpose relative to the ewes after having weaned their young, the necessity of clearing the ground for other stock, and the demand of the adjacent markets. Here the farmer must make "laws unto himself," according to his peculiar circumstances and his interest therewith interwoven. All this, of course, supposes that the rams and ewes are kept separate until the appointed time of their association, varying ordinarily from the middle of September to the middle of November.

The foregoing observations do not apply to the breeding of house lambs—that is, of lambs ripe for the butcher in November, December, and January. Generally speaking it is only in large towns and cities, where luxury demands forced fruits of the finest kinds, and forced vegetables of every description, to surprise, perhaps, rather than to gratify, and to show somewhat ostentatiously the power of wealth (which indeed can form a blooming Eden in the midst of surrounding snows), that house lamb is in extensive demand. It sells, of course, at a high price, and in certain cases the rearing of these lambs is a matter of profit. They are housed and defended from the cold, and the weaning time commences in September, and is continued through October, so that in November and December the lambs are ready in succession for the market.

It is important to the farmer who looks for healthy and vigorous lambs, that both parents should be themselves in full health and energy. Previously to the admission of the ram into a flock of ewes they should be well looked over, and if any appear drooping, dull in the eye and countenance, or leaner than beseems a well-fed sheep, they should be immediately separated; as indeed should those from whom on account of inferiority

it is not desirable to breed from. The sooner these are brought into condition for the butcher the better.

With respect to the ram, he should, if possible, be all perfection. He comes into maturity nearly as early as the ewe, but in the course of another year his constitution will be more fully confirmed; hence the flock associated with a young ram should not be so numerous as that which may be joined to one of greater age—on the average not more than forty or fifty, while seventy or eighty may be assigned to a two or three year shearing; a greater number would be unadvisable, as the progeny would be, in all probability, puny and degenerate.

The farmer now watches his flock, and in a few days will be enabled to ascertain the proportion that are impregnated, for those that are not so, crowd around the ram and follow him wherever he goes; if in the course of two or three days more, the number of impregnated ewes is not materially increased, it will be advisable to remove the ram and substitute another in his place. Some recommend an additional ram without removing the first, but this plan leads to incessant confusion and fighting, and we have known valuable rams killed in conflict with their rival. In the course of about three weeks the first ram should at all events be removed, and a fresh one substituted in his place—a plan which will ensure the pregnancy of all the ewes, excepting such as are barren.

The sheep produces one, two, or even three at a birth—twins are common. When three are produced it is necessary to remove one, and put it under the care of a foster mother, one who has lately lost her own lamb being chosen. It is seldom even on the best pasturage that a ewe can give support to three lambs without injury to her constitution, and of the three thus suckled the weakest will fare the worst. Indeed the rearing of twins requires good pasturage. Some breeds of sheep are more noted for the production of twins than others, a circumstance dependent doubtless upon hereditary predisposition, but not altogether unconnected with vigorous health and sufficiency of good food. It is not however usually at her first parturition that a ewe produces twins, her constitutional energy is not then at its maximum, nor is the supply of milk yielded for the first-born lamb more than sufficient for its sole support. At subsequent yearnings the secretion of milk is considerably more abundant; still however it is not always sufficient for twins, one of which will be often repulsed by the mother, as if it were an intruder, and thus become meagre and feeble. It is the farmer or shepherd's duty to see that this does not happen, and in cases where the milk is not sufficient for the two, to find a substitute in place of its own parent for the enfeebled and deserted young one.

Occasionally some of the ewes in a flock having twins stray inadvertently from them, so to lose one or both; in this case the farmer will have to bring them again together, and that he may do this with the more certainty, he would find it a good plan to mark all twins as soon as produced with a distinctive character or number (and the dams also). Many difficulties and mistakes might by such a proceeding be at once obviated. If the lambs have been purposely deserted it is probable that she will refuse to acknowledge one, or acknowledge it with an indifference so unlike the usual gaze and call of tender solicitude as to convince the farmer that it will be deserted. Probably he finds its strength failing, in this case it must be suckled from the bottle of ewe milk which the superintendent of the flock carries with him at this juncture, in case of its being required, and having restored it he may hope that as soon as the udder of the dam becomes surcharged with milk the natural affection for her offspring will rekindle; if so, all goes on well—if the contrary, he must seek out a ewe who has lost a lamb of the same age, and by some contrivance pass the rejected one upon her as her own.

Hogg, in the *Shepherd's Calendar*, says, "It is well known that it is a custom with shepherds when a lamb dies, if the mother has a sufficiency of milk, to put another lamb to her; this is done by placing the skin of the dead lamb upon the living one, and thus acquiring something of the smell of her own progeny, and being put to her in a dark confined place, she accepts and nourishes it as her own. If it does not speak much in favour of her intelligence it illustrates her maternal affection, that after the supposititious one has suckled her two or three times, such is her joy at the supposed recovery of her young one that she bleats over it and caresses it, and shows more fondness for it than she did for the one that was really her own." With respect to this contrivance we do not think that the sheep is at all deceived by it; the smell of a dead lamb is not like that of a living lamb, nor is it likely that she would mistake a lamb thus disguised and smeared with the blood of the dead one, as really identical with the lamb she had lost; it is an instance of the diversion of the instinctive *στοργή** into a new channel, its natural course being cut off. This instinctive overwhelming affection for the young is not to be repressed; it will gush forth into activity, and readily fixes upon the first and most appropriate creature presented—a creature in its turn demanding just such a display of feeling. We admit that a ewe will follow its dead offspring for miles, and stand over it mourning for hours and even days, courageously attacking any dog which may approach; and why? because she instinctively knows it to be her own, not by the

* Mutual affection.

smell, but from that mysterious feeling which teaches the parent bird to distinguish her nestlings, even when fledged, from others of the same species, and to supply their wants till they can subsist for themselves, her *στοργή* vanishing when its exercise is superfluous, but to return for her new brood. The ewe stands over her dead lamb, she watches it, she calls it in vain; she puts her muzzle to it, as she would do were it alive—(of death in the abstract she has no idea); but let her be removed to a quiet spot, and a lamb of the same age as her own brought to her, and the chance is that she will adopt it, and caress it, and feel pleasure in giving suck. Instances of a far stranger transfer of affection than that of a bereaved ewe to a stranger lamb are on record. For many of course we cannot vouch, and some may be placed in the same category with that of Romulus and Remus, who were nursed by a she-wolf; however the following passage from White (*Nat. Hist. of Selborne*) may be not uninteresting, and the more so as the facts are to be depended upon. "My friend," he writes, "had a little helpless leveret brought to him, which the servants fed with milk in a spoon; about the same time his cat kittenned, and the young were dispatched and buried. The hare was soon lost, and supposed to have gone the way of most foundlings—to be killed by some cat or dog. However in about a fortnight, as the master was sitting in his garden in the dusk of evening, he observed his cat, with tail erect, trotting towards him, and calling with little short inward notes of complacency, such as they use towards their kittens, and something gamboling after, which proved to be the leveret that the cat had supported with her milk, and continued to support with great affection. Thus was a graminivorous animal nurtured by a carnivorous and predaceous one.

"This strange affection probably was occasioned by that *desiderium*, those tender maternal feelings which the loss of her kittens had awakened in her breast, and by the complacency and ease she derived to herself by procuring her teats to be drawn, which were too much distended with milk, till from habit she became as much delighted with this foundling as if it had been her real offspring."

Sir W. Jardine in a note adds, "About two years since, at a cottar's house in Annandale, Dumfriesshire, a litter of pigs by some accident lost their mother; at the same time a setter bitch happening to pup, and the puppies suffering the common lot to most such, their place was supplied by the young pigs, which were well and affectionately nursed by their foster parent."*

In these cases it is evident that the desire of

personal comfort and relief, combining with the cravings of maternal affection, as yet unresponded to, led to the most unexpected results; in both instances the young of species almost as far removed asunder as is possible among quadrupeds, were adopted. That the ewe, under similar circumstances, should transfer her affection to another's lamb is not therefore surprising; but that this adoption is not connected with any false supposition on her part, may be inferred from the fact, that in many instances the ewe at first refuses to accept her offered protégé until she has been compelled to let it suck once or twice, when a mutual good understanding takes place, and the ewe and lamb may be turned into the field without any apprehension.

The fact is, that although the ewe may occasionally neglect or repulse one of her youngling twins—nature dictating that more than a single one cannot be duly sustained by her—no animal displays more instinctive attachment to her progeny. No one can have failed to observe this who has contemplated a flock of ewes with their sportive lambs depasturing on the green meads in spring. Watchful of her charge, every ewe loses her natural timidity, and becomes bold in its defence. She faces round as you approach her; she stamps at the appearance of a dog—she is ready to make the assault.

Numerous are the anecdotes bearing upon the devotion of the sheep for her young, which have been at different times recorded—many of them, we cannot help suspecting, somewhat exaggerated, others perfectly fictitious. We have seen ewes in trouble respecting their lambs on more than one occasion, but we never yet saw one come to solicit aid by looks and voice—a sort of affair which *tells* in the pages of *anecdote-mongers*, who foist upon the public the most palpable falsehoods, often making out instances of profound sagacity and brilliant invention, exemplified in the conduct of animals utterly incapable of such exhibitions. It is not here our cue to play the critic; albeit, the spirit of Juvenal, "the satiric rogue," is at this moment in the ascendant. However, we will give a tale of the marvellous—"credite" (*vel non credite*) "*posteris*."† "A gentleman of Inverness, on a recent journey in the Highlands, while passing through a lonely and unfrequented district, observed a sheep hurrying towards the road before him, as if to interrupt his progress, and at the same time bleating most piteously. On approaching nearer the animal redoubled its cries, and *looking significantly* in the face of the traveller, seemed to implore some favour or assistance at his hands. Touched with a sight

* "A boy," writes Gilbert White, "has taken three little young squirrels in their nest, or drey as it is called in these parts. These small creatures he put under the care of a cat who had lately lost her kittens, and he finds that she nurses and suckles them with the same assiduity and affection as if they were her own offspring. So

many people went to see the little squirrels suckled by a cat, that the foster mother became quite jealous of her charge and in pain for their safety; she therefore hid them over the ceiling, where one died."

† Let posterity believe it or not.

so unusual, the gentleman alighted, and leaving his gig, followed the sheep into a field in the direction whence it came. There, in a solitary cairn, at a considerable distance from the road, the sheep halted, and the traveller found a lamb completely wedged between two large stones of the cairn, and struggling feebly with its legs uppermost. The gentleman instantly extricated the little sufferer, and placed it safely on the neighbouring green sward, while its overjoyed mother poured forth her thanks in a *long-continued* and *grateful*, if not *musical*, strain." A sheep hurrying to and fro in distress, and ever and anon uttering its bleating cry, would naturally attract attention; but that it should stop a traveller on the highway, and by its *significant looks* solicit aid, is more than we can believe. Mr. Hogg, the Ettrick Shepherd, tells us the story of a poor bereaved ewe, which really appeals to the heart, and puts us in mind of the dog which watched over its master's corpse for many weeks after death, "far in the bosom of Helvellyn." "One of the two years," he says, "while I remained on the farm at Willerslee, a severe blast of snow came on by night, about the latter end of April, which destroyed several scores of our lambs; and as we had not enough of twins and odd lambs for the mothers that had lost theirs, of course we selected the best ewes and put lambs to them. As we were making the distribution, I requested of my master to spare me a lamb for a ewe which he knew, and which was standing over a dead lamb in the end of the *hope*, about four miles from the house. He would not let me do it, but bid me let her stand over her lamb for a day or two, and perhaps a twin would be forthcoming. I did so; and faithfully did she stand to her charge. I visited her every morning and evening for the first eight days, and never found her above two or three yards from the lamb; and often, as I went my rounds, she eyed me long ere I came near her, and kept stamping with her foot, and whistling through her nose, to frighten the dog away. He got a regular chase twice a-day as I passed by; but however excited and fierce a ewe may be, she never offers any resistance to mankind, being perfectly and meekly passive to them. The weather grew fine and warm, and the dead lamb soon decayed; but still this affectionate and resolute creature kept hanging over the poor remains with an attachment that seemed to be nourished by hopelessness. It often drew tears from my eyes to see her hanging with such fondness over a few bones mixed with a small portion of wool. For the first fortnight she never quitted the spot; and for another week she visited it every morning and evening, uttering a few kindly and heart-piercing bleats, till at length every remnant of her offspring vanished, mixing with the soil or wafted away by the winds."

This anecdote shows the strength and duration of the maternal attachment in the sheep. We know not, however, that the sheep is in this respect superior to other animals, either of the carnivorous or graminivorous orders of mammalia, or that gregarious and solitary animals display in this instinctive *στοργή* any marked distinction. Among gregarious animals, however, we naturally expect to see a display of peculiar personal sympathy towards each other, and of solicitude for each other; in the instance of the sheep, at least, these moral characteristics are very observable. When a flock of sheep is scattered over the hill-side quietly feeding, it will generally be seen subdivided into little groups of three, four, or five, which keep close together, as if united by bonds of stricter fellowship than those which hold them to the flock in general; and there is reason to think that this is really the case, for generally the same sheep will be seen day after day in company, or rather, there are many facts on record which abundantly prove it. Some few years since there was among the sheep fed in Regent's Park one which suffered under a bad foot-rot. It crawled along the pasture on its knees, and with difficulty contrived to procure for itself subsistence, and when obliged to rise evidently suffered intense agony. It has been often said that in such cases a companion, permanently attached to the sufferer, may be always seen within a little distance, and such was the case in the present instance. Mr. Youatt, who has recorded the fact, and whom we have heard speak of it, says, that as he took his regular morning's walk through the park to the Zoological Gardens, he invariably sought out the friends; and, after two or three days, becoming assured that no harm was intended them, they suffered him to approach sufficiently near to observe and to comprehend their inter-communication of signals, and fully to satisfy himself that it was always the same faithful adherent by whom the cripple was selected and watched.

It is not only sheep that are lame or crippled that are carefully attended; those which unhappily may have become blind, and are therefore rendered extremely dependent on their companions, are not deserted; they are guided and cheered by some friend, whose voice gives double pleasure.

So strong is the disposition of the sheep to form friendships, that it will for want of companions of its own species, give its affections to other animals, and even to man. In all ages this has been noticed, and the parable of the ewe lamb, uttered by Nathan in the presence of David, is the faithful picture of an ordinary circumstance. Pet sheep and lambs have ever been common in the East, and are so in many places even at the present day. Mr. Jesse notices the instance of a sheep which was brought up by hand, and

which had only a solitary horse to bestow its affections upon, as forming a strong attachment to its equine companion, by whose side it habitually grazed in security. The following account in the *Illustrations of Natural History*, may be received as authentic:—"A drover being on his way to Smithfield market with a flock of sheep, one of them became so sore footed and lame that it could travel no further. The man, wishing to get rid of the impediment, took up the distressed animal and dropped it over the pales of a paddock, belonging to Mr. O'Kelly, where the celebrated race-horse Dungannon was then grazing, and pursued his journey, intending to call for the sheep on his return—believing that after a little rest it would recover quickly, and which was the case,—a strong attachment, however, soon grew up between the inhabitants of the paddock; the horse would playfully nibble the neck of the sheep, and without hurting it would lift it into the manger of a neighbouring shed belonging to the field, as much as to say, although you are not able to reach it, I will help you to the banquet. Besides this, the horse would on all occasions protect his new friend, and would suffer no one to offer him the slightest molestation. Mr. O'Kelly having been made acquainted with these circumstances, bought the sheep, and left the two friends in peaceable possession of the paddock, and its adjoining shelter."

In folding sheep at night, it is an unwise thing for the shepherd to separate those between which a peculiar intimacy subsists; they have fed together, they have comforted and watched for each other during the day, and to part them is to make them restless and uneasy. If the fold is not large enough for the whole flock, the shepherd should exercise his judgment in so contriving as not to dispart associates. Nay, a writer in the *Edinburgh Farmer's Magazine*, 1824, after forcibly describing the great alarm and distress that the separation of friends produces, and the general tumult and disturbance of the whole fold, adds, that "they who have had observation and feeling enough to appreciate what may occasionally pass in the mind of a sheep, have traced to this, or to a similar cause, the after declension of strength, and the inability to endure the inclemency of the season." Without going quite so far, we at once admit that the animals will pine, lose their appetite, become dispirited during the day, and agitated at folding time. These things may appear in themselves trifles, but the prosperity of a flock is no trifle, and everything interfering with its comfort, confidence, and tranquillity, ought sedulously to be avoided. Why then violate the instinctive attachments which these animals form for each other? why disregard ties which render them contented and happy? Humanity and interest alike forbid it.

Those who have only seen flocks of sheep

spreading over vales and lowlands, or watched them driven along dusty roads, or through the streets of towns and cities, huddled together, disturbed, frightened by noises and strange sights, and worn out by the incessant efforts of the dog to keep them in the right track, might perhaps be surprised at the boldness, activity, and free bearing of the animal in its mountain home, that is in a state of nature as near as is compatible with its reclaimed condition. Among the rocks and precipices of the Peak of Derbyshire, we have seen the sheep in situations apparently of the greatest danger, and to which we wondered how they could attain, on jutting ledges, on the edge of abrupt and perpendicular masses of rock, on mere foot-holds along the sides of steep declivities, where, quietly feeding upon thyme, close mountain herbage, and various shrubs, they would look down with the utmost unconcern, every now and then uttering their calls to each other. On the moorlands they are wild and independent; so far from being "devoid of every necessary art of self-preservation, without courage, and deprived of every instinctive faculty," as Buffon describes them, they depend on their own resources, and know when to fly, where to seek refuge, and if pressed, how to combine in repelling an intruder. It is from one fact we think that Buffon has been led to form his ideas of the sheep: in the mountains of France, Italy, and other parts of the continent, wolves abound, consequently the sheep are never left unguarded by men and large dogs, which latter they look upon as their natural defenders, consequently they are not permitted to exercise their own instincts, and being always kept under surveillance, never in the least degree exhibit a trace of that cautious watchfulness and resolution when pressed, which are so characteristic of the wild moutons and argalis. In the wilder parts of our island the fox, if we except the eagle and a stray sheep-killing dog, is their most formidable foe, but the fox will only destroy lambs, and will yield to the attack of several sheep united; consequently in our northern mountains, where they are depastured from April or May till autumn, without any definite attendance, the sheep exhibit an independence which does not manifest itself in the sheep of the mountain districts of continental Europe, excepting, indeed, in localities where small flocks have become truly feral, and from a combination of circumstances returned to a state of freedom.

Our mountain sheep, like the mouflon, are vigilant and not easily daunted. We have ourselves seen a small flock on our approach suddenly retreat, then stop and turn round, the leaders stamping with their feet—on our nearer approach again retreat, turn round and stamp menacingly as before; and we have known them give chase to a dog. On many occasions a single ram has been known to

attack a single dog or fox, and prove victorious. When, however, the danger is more alarming, the flock unites in a phalanx, with the lambs and ewes in the centre, and waits the approach of their enemy. On his arrival within a certain distance, the rams rush impetuously forward, and from their weight, strength, and hardness of the skull, the onset is not a little formidable. Indeed the stroke of a ram on the head of a bull once or twice repeated, has been found sufficient to quell the combativeness of the latter; Bewick, indeed, says that it sometimes brings him to the ground. Some years since a noble Brahmin bull was living in the Gardens of the Zoological Society. Generally speaking this magnificent and powerful animal was very docile and easily manageable. Sometimes, however, he would exhibit dangerous symptoms, and become unruly. On these occasions it was usual to place a ram in the same paddock with him, for the question of mastery was sure to be tried; but in all contests we believe the ram speedily proved victorious; for the bull, lowering his "awful front," received the sturdy and repeated butts of the ram on his forehead, the stunning concussion of which was too much for the larger champion to endure.

Mr. Hall, in his *Travels in Scotland*, tells an adventure that happened to himself, which although calculated to make one smile, has, if dispassionately considered, nothing of the ludicrous in it, as those who have been knocked down and stunned by the blow of a sheep will readily aver. "I was one day," he says, "climbing the mountain of Belrennis. On reaching the top I found myself in a cloud, where I could not distinctly see any object at the distance of more than a few yards. As there was a fine breeze I hoped that the cloud would disperse; and although I felt exceedingly cold and hungry, I resolved to remain there a little while. While I was walking about to keep myself warm I perceived something of an uncommon appearance at a little distance from me, and I approached it, not indeed without fear. I found it to be a phalanx of sheep, drawn up on the top of the hill, and ready to defend themselves against attack. They were arranged in a kind of wedge, presenting its blunt end foremost. In the middle of the line was a large ram with a black forehead and a tremendous pair of horns. A number of wether ewes were in the rear, not one of them eating, but looking sternly upon me. I was not at first afraid, knowing them only to be sheep, and yet I was not perfectly easy; for if any fox appeared they might kill me in chasing him.

"These sheep had been sent into the mountain in April or May, where the owners seldom look after them until October. When they gather themselves together at night, one of them is always placed at a little distance as a sentinel. They never descend into the valley at night, but even in

the most stormy weather they are on the top of the hill or on rising ground; and if they are attacked by foxes or dogs, their assailants rarely fail to pay for their temerity with their lives. Seeing them, however, in this warlike array, I began gradually to feel a little alarm; and deeming discretion to be the better part of valour, I slowly retired. As the distance between us increased, their line was neither so straight nor compact; but if I stopped and again advanced a few steps towards them, they looked steadily at me, and formed their line with greater precision and coolness; and had I attempted to attack them, I am convinced they would have resisted. I had once a great mind to try, but I confess my courage failed me when I observed them seemingly bending their knees in order to make one simultaneous rush upon me." We believe the experiment would have been hazardous.

We have here the picture of a flock of sheep, in a mountain country, left to their own resources. *Silly* and *timid* are words scarcely applicable to them. There is one point in the narrator's details to which we again advert. He states that they never descend into the valley at night, or rest in a low sheltered place, even in the most stormy weather, but seek the top of the hill, and place a sentinel as watch. In this habit they agree with the mouffons. Even during winter, when one would think that some shelter would be preferred, they seek the top of the highest hill. Here, however inclement the weather, the snow-storm cannot overwhelm them, nor can any enemy steal upon them unobserved. In lowlands and vales sheep do not exhibit, at least in any marked manner, this instinctive trait; indeed, they have seldom the opportunity given. In winter, whether confined or not, they are put into sheltered spots, so as to be protected against the severity of the weather, or are so placed as to be able to seek refuge from the storm. The sheep have generally an unerring foresight of the approach of a heavy drifting snow-storm, and will eagerly seek a place of refuge—the lee side of a copse, thicket, plantation, or hedge, or some snug hollow. It would be well if the shepherds generally were in the habit of constructing rude huts, dispersed over wide sheep-walks, not only capable of affording shelter, but supplied with a sufficiency of hay. By this plan the safety of the flocks might almost be insured; for it often happens that the secluded spots to which the sheep retreat, become buried beneath many feet of snow:—

"In this dire season oft the whirlwind's wing
Sweeps up the burden of whole wintry plains
At one wide waft, and o'er the hapless flocks,
Hid in the hollow of two neighbouring hills,
The billowy tempest whelms, till upward urged
The valley to a shining mountain swells,
Tipt with a wreath, high curling in the sky."

THOMSON.

It is however rather in the wild and hilly districts of our island than in the plains and lowlands that the greatest danger arises from snow-storms, and the heaviest losses are suffered, for it must not be supposed that the mountain top is sought for by all hill-fed sheep, or that it is a common practice to leave them to their own resources, unattended by the shepherd and his assistants; on the contrary, the flocks are sedulously watched, and a heavy snow-storm brings toil and anxiety to the sheep owner and his men. The following is extracted from an original article of some length which appeared in the *Penny Magazine* for 1840, and is well worth attention:—"Though sheep," says the writer, "like most other animals, appear to be endowed with a certain degree of instinct, yet it does not follow as a matter of course that it always operates towards ensuring their safety. Persons who have had the most frequent opportunities of observing them generally appear to have come to this conclusion, that when a storm is approaching they are seldom taken by surprise, or in fact before it actually comes on they have endeavoured to find a place to shelter themselves from its fury. But in cases of snow-storms among the mountains, it very generally happens that the places of shelter from the bitter and piercing blast are places fraught with the greatest danger, for it is there that the drifting snow accumulates in vast masses, and while the flocks that have sought shelter are comparatively warm and comfortable, probably before they are aware the drift will have become piled up in such a manner as to render all attempts to retreat impracticable, even were they inclined to do so. Thus it sometimes happens that in the space of a very few hours scores, nay perhaps hundreds, of sheep become buried beneath the snow to a depth of several feet. In most parts of these mountain regions, where the hills are pretty steep, their sides are usually furrowed by several cliffs or deep and narrow ravines, down which trickle the waters of small springs, that commonly have their rise in the upper part of the mountain. The spaces along the sides of the hills between these respective furrows or dells for the most part are smooth and bare, so that at the approach of a snow-storm, should these places be resorted to by the flocks as places of shelter, they are soon buried to a considerable depth, since all the snow that falls on the smooth portions of the mountain is hurled into these dangerous ravines.

"When a snow-storm comes on unexpectedly the losses in the flocks of sheep are generally the greatest, for when it is foreseen the shepherds are on the alert, and though it may not be in their power to prevent some portion of the flock being buried (overblown as they call it) beneath the

snow, yet in most cases they are aware of the situation the missing sheep occupied when the storm came on, and consequently know pretty well where to search the drifts for them. When the snow falls extremely light and feathery the drift will hardly sustain a person's weight for a day or two afterwards, but in such cases there is not much danger of the sheep being suffocated under it; but when it falls in a softer state, but yet light enough to be drifted by a strong wind, the drift at once becomes consolidated and heavy, and then it is that there exists great danger of the sheep being quickly smothered.

"There are two methods pursued in searching for the missing sheep when a snow-storm has subsided; one is with dogs, sheep-setters, or as they are sometimes called sheep-finders. The other is as follows: three or four persons go in company, carrying with them a couple of long smooth poles, and also some spades and shovels. Those that carry the poles walk along the drifted snow beneath which they suspect some of the sheep are buried, frequently pushing their poles gently through the snow, in order to ascertain by the touch the presence of the missing sheep, when having made the discovery of one or more, the shovels are employed in opening a way by which to liberate the innocent prisoners. Persons accustomed to this *prodding*, or probing for sheep, as it is called, can readily distinguish by the touch of the pole the woolly coat of a sheep from any other substance, even from the bushy and elastic heath, or the softer bent and mountain moss. This mode of search however is a slow and tedious process where there is a considerable breadth of drift, a great deal of time being necessarily consumed in carefully examining a comparatively small space. Besides it sometimes happens that the drifts are so deep that an ordinary pole will hardly penetrate them to the bottom, and in that case the system becomes altogether useless.

"The employment of dogs to find the lost sheep is by far the better plan where it can be effected. The sheep-setter is of no particular breed, though for the most part these dogs belong to the cur species; but there are so many varieties of the cur, or at all events so many coming under that very general term, that it would be impossible to define what particular class my father's dog Corby the sheep-finder belonged to. He was large and black, strong limbed, long and lean bodied, shaggy coated, with a little white on the breast as well as between the eyes; his ears were precisely those of the common cur, and his tail, for he was not tailless, was both large and long. Corby from his puppyhood was a favourite in the family, certainly not on account of his personal attractions, for these were by no means in his favour, but from sundry good qualities that he was

early discovered to possess. He was docile, sagacious, courageous, and faithful; and when he grew up he exhibited an extraordinary sense of smelling, particularly as regarded sheep, and hence he soon became the most renowned sheep-setter through a wide range of country. This rendered him of so much account that it in a manner changed his destiny; for having been brought up with no other view than that of his being employed as an ordinary shepherd's dog, his superior qualities soon procured for him a higher distinction, and he became a privileged character in the sitting-room and parlour; scarcely any services were required of him except after a severe snow-storm, when he was called upon to exercise his vocation, which during many years he lived to do, and with wonderful success.

"It was not upon our own farm and flock alone that Corby exercised the extraordinary powers nature had endowed him with, for his fame as a sheep-finder extended through all the surrounding parishes, and many were the messages and requests that his owner would permit him to be taken to the distant parts of the upland country, where portions of the sheep flocks were often buried beneath the snow. We had a servant boy to whom the dog was much attached, and when it was convenient to spare the latter for the exercise of his abilities to the benefit of our neighbours, the former usually accompanied him, for it was not to be supposed that so faithful and sagacious a creature would voluntarily accompany entire strangers. Money of course my father would never accept for Corby's services, but the boy that used to accompany the sheep-finder was not so rigidly scrupulous, and many were the shillings and half-crowns that he pocketed in the course of a stormy winter.

"The sagacious animal always took advantage of the wind where that was practicable, and the moment he was told to seek the sheep and be careful, his whole attention was bestowed upon those parts of the snow-drift that the parties pointed out to him. With his nose close to the surface of the snow, his eyes beaming with intelligence, and anxiously watching every motion of the person that accompanied him, his ears in an attitude of listening, as if he expected to assist the sense of smelling by that of hearing, would he traverse the hard, soft, or slippery snow-drift. When he first ascertained that there were sheep in the vicinity somewhere, he would then examine with peculiar caution every part of the surrounding surface till he appeared to have satisfied himself of the precise locality, and then he would commence scratching away the snow with all his might. This was a sure signal for those who carried the shovels to commence digging, but the dog was never satisfied unless he were allowed to continue his scratching, as if he were anxious to

set the imprisoned sheep at liberty as soon as possible. Many dogs, and particularly those that have a cross of the terrier breed, occasionally employed in searching for sheep which have been overblown, will endeavour the moment they get a sight of the sheep to seize upon them with as much savageness as they would attack any wild animal; but Corby knew better than to act thus. In a single severe winter this dog has been known to have set (as finding the sheep in this manner is called) upwards of three hundred sheep; and though it may be true that a portion of them might have been discovered through other means, the probability is that he was the means of rescuing several scores that otherwise would have inevitably perished.

"It might be supposed that when sheep are buried beneath eight or ten feet of compact snow, they would be crushed beneath the surrounding weight, if not immediately to death; at least in so severe a manner that they could not long survive. This, however, is rarely the case; and except when the fall of snow is immediately succeeded by a thaw, and suffocation or drowning naturally ensues, very few comparatively perish on account of the great depth of the drift, the snow being so porous that respiration is carried on without much inconvenience. Experience has shown that, for the most part, when sheep which have sought shelter in some ravine or hollow perceive the snow rapidly increasing on and around them, they get upon their feet, and attempt to shake it from their fleeces; consequently they become enclosed in a standing position by the drift. With the weaker portion of a flock this is seldom the case, for they commonly continue motionless where they have first lain down, in some sheltered situation, until the snow has accumulated so much that it would be impossible for them to rise did they make the attempt. The consequence is, that if they are not rescued for several days, they either perish through actual starvation, not being able to move at all or obtain the smallest particle of sustenance, or their limbs become stiff and paralyzed before death actually takes place. Those, however, that have been buried in the snow in a standing position, should they continue undiscovered several days, are generally found to have acquired sufficient room to turn themselves, and to be able to lie down and rise at pleasure, and where a few have happened to stand close together while the drift was forming, owing to the united warmth of their bodies, as well as their frequent movements, a rather considerable open space is commonly found surrounding them.

"Instances have occurred of sheep being under the snow for three or four weeks and still surviving, and even for longer periods; but in

all such cases they have had the power of nibbling the short grass, grass-roots, and even a portion of the soil on a space of a few superficial feet, by which means life has been sustained through so protracted a period of confinement. It has been ascertained also that where sheep have actually been starved to death before they have been discovered, extreme hunger had driven them to tear the wool from each others' backs, which only goes to prove the powerful influences of utter destitution on these meek and innocent creatures. When sheep are discovered that have suffered a long confinement under the snow, on their being liberated it is necessary to administer food in small quantities, otherwise fatal consequences might ensue; and notwithstanding they may partly regain their wonted vigour in course of time, it rarely happens that such sheep ever afterwards appear in a perfectly healthy condition, and in the enjoyment of all their faculties."

Hogg, the Ettrick Shepherd, has given in his *Calendar* an awful account of the principal great snow-storms which occurred in the Cheviots and other districts during various winters, from the seventeenth to the eighteenth and beginning of the nineteenth century. Who can read his narrative of the "Thirteen drift days in the middle of the seventeenth century" without horror! "For thirteen days and nights," he says, "the snow-drift never once abated; the ground was covered with frozen snow when it commenced, and during all the time of its continuance the sheep never broke their fast. The cold was intense to a degree never before remembered, and about the fifth and sixth days of the storm the young sheep began to fall into a sleepy and torpid state, and all that were so affected in the evening died in the night. About the ninth and tenth days the shepherds began to build up huge semi-circular walls of their dead, in order to afford some shelter to the remainder; but shelter availed little, for the want of food began to be felt so severely that they were frequently seen tearing one another's wool.

"When the storm abated on the fourteenth day there was on many a high-lying farm not a living sheep to be seen. Large misshapen walls of dead surrounded a small prostrate flock, likewise all dead, and frozen stiff in their layers, were all that remained to the forlorn shepherd and his master. In the extensive pastoral district of Eskdale-muir, which previously contained more than 20,000 sheep, only forty young wethers were left on one farm, and five old ewes on another. The farm of Phants remained without stock and without a tenant for forty years after the storm; and an extensive glen in Tweeds-muir became a common to which any man drove his flocks that pleased, and so it continued for nearly a century."

Thank God it is not often that such scenes of desolation, of such utter devastation, occur in the course of Providence; nevertheless, a shepherd's life among the mountains during winter must be replete with anxiety, and the indications of a coming storm must excite the most painful apprehensions. It is not to the sheep only that these storms are fatal—men, horses, horned cattle, dogs, and other animals are alike exposed to danger. "Of all the storms," says Hogg, in the *Shepherd's Calendar*, "that ever Scotland witnessed, or I hope will again behold, there is none of them which can be compared to that of the night between the 24th and 25th of January, 1794. This storm fell with peculiar violence on that division of the South of Scotland which lies between Crawford-muir and the Border. In these bounds seventeen shepherds perished, and upwards of thirty were carried home insensible, who afterwards recovered. The number of sheep that were lost outwent any calculation. One farmer alone lost seventy-two scores, and many others in the same quarter from thirty to forty scores each. Whole flocks were overwhelmed with snow, and no one ever knew where they were until the snow dissolved and they were all found dead. I myself witnessed one particular instance of this. There were twelve scores of excellent ewes all of one age that were missing all the time that the snow lay, which was only a week, and no traces of them could be found; when the snow went away they were discovered all lying dead, with their heads one way, as if a flock of sheep dropped dead going from the washing. Many hundreds were driven into waters, burns, and lakes by the violence of the storm, where they were buried or frozen up, and these the flood carried away, so that they were never seen by the owners at all. The greater part of the rivers on which the storm was most deadly run into the Solway Frith, on which there is a place called the Beds of Esk, where the tide throws out and leaves whatever is carried into it by the rivers; when after the storm the flood subsided there were found in that place, and the shores adjacent, 1,840 sheep, 9 black cattle, 3 horses, 2 men, 1 woman, 45 dogs, and 180 hares, besides a number of meaner animals."

In these exposed situations the utility of rude but substantial covered buildings, or large huts of refuge, supplied with hay, and thus affording at once shelter and food, is very obvious; the adoption of these circular huts or *stells*, as he calls them, is strongly advocated by the Hon. W. J. Napier, in his *Treatise on Practical Store Farming*. He well observes that at the commencement of the fall the sheep, accustomed to these *stells*, will naturally draw towards them, and with a little exertion reach them, and thus place themselves in safety, feeding upon the hay with which they are

stored, while the sleet and snow drive fiercely down the glens; but the storm over, they venture forth, and commence digging the snow in quest of the half-green grass, which they prefer to the best hay that can be provided. In this labour they will persevere as long as they feel themselves proof against the cold, and it may be left to their own choice whether to work without, or find their sustenance within; they will indeed be seen many times in the day passing and repassing according to the change of the blast. Instinct will teach them when to fly for shelter, and when to return to the pasture, at the same time the shepherd may be with them, rejoicing in the consciousness of his own safety as well as theirs.

With respect to the form of these *stells*, the writer just referred to recommends that they be circular, and about thirty feet in diameter inside, capable of containing seventy-five sheep each, so that fourteen of these *stells* would accommodate upwards of a thousand sheep; the cost of each being under two pounds. Where the sheep are scattered wide, in districts liable to sudden storms, he recommends that at least twenty-four *stells* should be erected, in order that no time may be lost before the sheep are in safety; and he justly argues, that the preservation of the sheep will more than counterbalance the expenditure in these buildings. On this point he quotes the authority of Mr. Laidlaw, an experienced sheep-master. There were two farms on Ettrick, Bowerhope and Crosscleugh; Bowerhope was provided with *stells*, Crosscleugh had none. The winters of 1816 and of 1818 were very destructive to sheep. The extra loss of lambs and sheep on Crosscleugh was 400 lambs and 70 old sheep, amounting in value to £230; that on Bowerhope amounted to 120 lambs and 18 old sheep, worth £66—leaving £164 saved by the *stells*. But Bowerhope kept at least one-third more sheep than Crosscleugh, and therefore the saving was considerably more than £200. Had this its proper effect on the sheep-farmers? Did they become wiser from experience? No. They consoled themselves with repining at the bad seasons, and they trust merely to better times, and to the landlords' generosity to save them from impending ruin.

In addition to *stells*, the Hon. W. Napier adopted a better plan of smearing the sheep; for without the application of some unctuous material to the fleece, so as to render it impervious to wet or cold, it is not possible to maintain the health and vigour of sheep exposed in dreary mountain regions to the piercing blasts and driving sleets, and the vicissitudes of the weather. A mixture of tar and butter is the usual smearing ointment; but Mr. Napier used spirits of tar and whale oil. The disadvantage of tar is, that it communicates

an indelible stain to the wool, rendering it unfit for white goods, and more or less unadapted for some of the richer dyes. Mr. John Graham, of Newbigging (*Price's Essays, and Transactions of the Highland Society*, vol. ii.), recommends the following mixture:—hog's lard and butter, melted together, of each 18 lbs.; resin, 12 lbs.; gallipoli oil, one gallon. This is sufficient for fifty sheep, or fifty-five, and the wool is not in the least deteriorated by it. The use of this ointment, or of similar compositions, or in other words, the practice of smearing, is intimately connected with locality and climate. "The use of a small quantity of some oleaginous or greasy application, immediately after shearing, will be gradually acknowledged. The protection which it affords to the almost denuded skin, its substitution for the natural yolk, which is not immediately secreted in its full quantity, and the softness which it will impart to the wool, are circumstances well deserving of attention."—YOUATT.

We must, however, return from this digression, to which we were led by a consideration of the moral characters which the sheep exhibits when led by circumstances to trust to its own resources.

All gregarious animals exhibit an instinctive principle of imitation, more or less decided and palpable. Herds of antelopes follow their leaders, and bound over the plain, following each other in succession. In the sheep this instinctive principle seems almost at its maximum—where the leader goes there the rest follow, and hence it is easy, by means of trained leaders, to manage the most extensive flocks.

There are few who have not observed the pertinacity with which sheep endeavour to overcome every obstacle in order to rejoin their companions at liberty. If a number of sheep be penned up, or otherwise confined, and one overleaps the barrier, it is with the greatest difficulty that the rest can be prevented from escaping in the like manner. In their pasture grounds they follow each other from place to place, a leader taking the van, and thus they intersect the land with sheep-tracks of about a foot in breadth, along which, as along roads, they travel. The pertinacity with which sheep follow their leader sometimes leads to fatal consequences. For example, if a flock be alarmed, and the leader leaps the parapet of a bridge, and falls into the water, the rest blindly follow in rotation; or if the leader clear a bank or railing on the other side of which is a deep precipice, the rest take the same leap one after the other, and so quickly that unless the most prompt and strenuous exertions be used, the whole flock shares the same fate. It is stated in the *Annual Register* for 1808 that Mr. Sparks, near Guildford, had more than 800 sheep in one pasture field, when

being frightened by a dog, one of them jumped into an adjoining field, which was on a great descent. The rest then followed each other over the gap of the hedge so fast that one hundred and twenty were killed before any stop could be put to the movement. "A butcher's boy was driving some fat wethers through Liverpool, but they ran down a street along which he did not want them to go. He observed a scavenger at work with his broom a little way before him, and called out loudly to him to stop the sheep. The man accordingly did what he could to turn them back, running from side to side, always opposing himself to their passage, and brandishing his broom with great dexterity; but the sheep, much agitated, pressed forward. At last one of them came right up to the man, who fearing it was about to jump right over his head as he was stooping, grasped his short broomstick in both hands, and held it over his head. He stood for a few seconds in this position when the sheep made a spring and jumped fairly over him without touching the broom. The first had no sooner cleared this impediment than another followed, and another in such quick succession, that the man perfectly confounded seemed to lose all recollection, and stood in the same attitude till all had jumped over him, not one of them attempting to pass on either side, though the street was quite clear. As this took place during wet weather, the man was entirely bespattered over with dirt before they had all passed; and it is impossible to conceive a more ludicrous appearance than the poor fellow made on the occasion." — (*Illustrations of Natural History*, vol. i.)

Occurrences of a parallel nature have come under our own notice at various times; and more than once have we seen a man fairly knocked down by the headmost sheep as it made a spring, thus effectually clearing the way for the rest to follow.

With respect to the senses of the sheep, a few observations only will be necessary:—

Sight.—The eye of the sheep appears to be better adapted for nocturnal vision than that either of the horse or ox. The pupil is horizontally elliptical, and the interior lining reflects a yellow green; the white or *conjunctiva* should be of a clear

pearl colour. From the breadth of the forehead, the eyes in the sheep have considerable lateral prominence, and are lodged in projecting bony orbits. The area of vision is considerable. Blindness, both from *cataract* and *gutta serena*, is frequent among sheep.

Hearing.—There is nothing which requires peculiar notice in the structure of the organs of hearing. It would seem, however, that sheep enjoy the sense of hearing in considerable perfection. A sheep when lost among the hills utters its calls, and is heard by the flock at a great distance; their responsive cries are heard in turn, and thus the straggler is enabled to rejoin its companions. In countries where the wolf abounds, the sheep is said to be conscious of the approach of this enemy while yet at a considerable distance; but perhaps the sense of smell may assist that of hearing in this case, for we cannot conceive that the stealthy movements of the wolf afar off can be appreciated by the ear, however delicate.

Smell.—The sense of smell is certainly very acute, as the anatomy of the organs appropriated to this sense at once makes manifest, the turbinated bones being peculiarly developed, as is also the ethmoid bone. It is rather to this sense, as we have already said, than to that of hearing, that we attribute the knowledge which the sheep displays of the approach of a wolf, which animal, while yet at a distance, strikes terror into the flock. In the selection of proper herbage the sense of smell is continually in requisition, and by this the animal is guided, as in the case of the ox. However, the sheep will sometimes partake of noxious plants, and suffer accordingly.

In the wild mouflons and argalis the sense of smell is at a high ratio, and the hunter is obliged to have recourse to every artifice in order to come within gun-shot.

Taste.—The sense of taste is probably not very discriminating in the sheep, for the choice of food seems mostly to depend on that of smell. Doubtless, however, it is sufficient to contribute to the pleasure of the animal, and some articles, as salt, evidently afford great enjoyment. Saline and aromatic plants are greatly relished by sheep.

CHAPTER VI.

OUR DOMESTIC BREEDS OF SHEEP.

FROM these observations relative to the moral characters of the sheep and the relative perfection of its senses, we may now advance to a closer scrutiny of the principal breeds of sheep for which our island is justly celebrated.

It was formerly the practice to divide our sheep

into two classes, namely, LONG-WOOLLED SHEEP,—that is, sheep affording *combing* wool; and SHORT-WOOLLED SHEEP—that is, sheep affording *clothing* wool; and it must be confessed that until lately such a division was tolerably accurate, although wools of intermediate lengths and

qualities not unfrequently created some difficulty as to which section they ought in reality to be assigned.

Mr. McCulloch, in his *Statistical Account of the British Empire*, 1839, gives the following

tabular view of our principal breeds, which to the farmer of the present day cannot be uninteresting, if only for the data affording him the means of comparison between the sheep of that time and those of the present day:—

NAMES OF BREEDS.	HEAD.	Colour of Face and Legs.	WOOL.	Weight of Fleece.	Wethers per Quarter.	Age Killed.
1. Teeswater	No horns	White face and legs	Long wool	9 lbs.	28 lbs.	2 years
2. Lincoln	No horns	White face and legs	Long wool	10 lbs.	25 lbs.	2 years
3. Dishley, or New Leicester	No horns	White face and legs	Long wool, fine	8 lbs.	22 lbs.	2 years
4. Cotswold	No horns	White face and legs	Long wool, fine	9 lbs.	24 lbs.	2 years
5. Romney Marsh	No horns	White face and legs	Long wool, fine	8 lbs.	22 lbs.	2 years
6. Dartmoor, or Bampton	No horns	White face and legs	Long wool, fine	9 lbs.	25 lbs.	2 years
7. Exmoor	Horned	White face and legs	Long, coarse	6 lbs.	16 lbs.	2½ years
8. Black-faced, or Heath	Horned	Black face and legs	Long, coarse	3 lbs.	15 lbs.	3½ years
9. Hereford Ryeland	No horns	White face and legs	Short wool, fine	2½ lbs.	14 lbs.	3½ years
10. Morfe, Shropshire	Horned	Black and speckled	Short wool, fine	1½ lbs.	12 lbs.	3½ years
11. Dorset	Horned	White and speckled	Short wool, fine	3½ lbs.	18 lbs.	2 years
12. Wiltshire	Horned	White and speckled	Short, middling	3 lbs.	20 lbs.	3 years
13. Berkshire	No horns	Black and white	Long wool	7 lbs.	18 lbs.	2½ years
14. Southdown	No horns	Speckled and white	Short wool	2½ lbs.	18 lbs.	2 years
15. Norfolk	Horned	Black and white	Short wool	2 lbs.	18 lbs.	3½ years
16. Hardwick	Horned	Speckled and white	Short wool	2 lbs.	10 lbs.	4½ years
17. Cheviot	No horns	White face and legs	Short wool	3 lbs.	16 lbs.	4½ years
18. Dun-faced	No horns	Dun face and legs	Short wool	1½ lbs.	7 lbs.	4½ years
19. Shetland	No horns	Variously coloured	Fine clothing	1½ lbs.	8 lbs.	4½ years
20. Spanish	Rams horned	White	Short, superfine	3½ lbs.	14 lbs.	2½ years
21. Spanish Cross			Short, fine	2½ lbs.	16 lbs.	2 years

If we except the wool of the Anglo-merino breeds, short wool is almost obsolete in our island, that is in the strict sense of the term. We now derive our fine clothing short wools from Germany, from Australia, from Spain in a decreasing ratio, and in small quantities from Russia. The fact is that the old English short-woolled sheep have within late years gradually assumed new characters, and the fleece has become modified, having an average length of staple of three inches and a-half. At the same time our machinery has improved, and this wool, which may now be submitted to the action of the comb, is spun into threads of considerable tenacity and exquisite delicacy, and woven into fabrics of the most beautiful texture, fabrics of which a few years since we had no idea, and of which new modifications are every day brought into the market.

Since, then, the term *short wool* is no longer strictly applicable as a general appellation to the produce of our own once short-woolled breeds, it has been proposed to exchange the term for that of *middle wool*; and looking at our native *long wool* on one side, and our *imported short wool* on the other, this term is expressive of its leading character. Under this head will rank the Ryeland, the Dorset, the Norfolk and Suffolk, the Southdown, the Cheviot wools, together with the wools of some other breeds, in all of which the staple of the fleece has gradually lengthened and increased

in stoutness. In short, these wools, no longer applied to the purposes to which they were formerly, when the title of short wool was their due, are prepared as much by the combing as the card; and although they do not realize the extravagant prices they formerly did, yet owing to many circumstances they meet with a readier sale, while, to make up for any deficit on this head, the earlier maturity of the carcase, its improvement in weight, and its amelioration in quality, are more than make-weights in the balance in favour of the modern sheep-grazier. Mr. Youatt, speaking of the fine old short wools, judiciously observes, that the gradual introduction of other wools possessing delicacy of fibre, pliability, and felting qualities beyond what these could boast of, and at the same time cheaper in the market than the old British wools ever were or could be, has gradually caused the latter to lose ground in the manufacture of the finer cloths, so that now our home-grown short wools cease to be used in their production. If, however, they are no longer essential for clothing or fine broad-cloths, the change which has taken place in the construction of machinery has multiplied the purposes to which they may be devoted; they may indeed be looked upon as *short combing wools*, and of no ordinary importance. "It may be a little mortifying to the grower of British short wool to find that neither the superior nor middle classes of society will condescend to wear the cloths

produced from this material; but human ingenuity has not only brought good out of evil, but has increased the advantage previously possessed, and has placed the interests of the grower and the manufacturer of wool on a basis which no changes in fashion or commerce can ever more materially effect."

In one sense the short wools of our country have deteriorated. Some would say *no*, they have only changed, and that in consequence of the improvements in breeding, the attention shown to size, symmetry, and early ripeness, and the inter-crossings which under these aims have taken place; whether we call it deterioration or alteration, the fact is the same, and cannot be gainsaid. Our short-woolled sheep are heavier than they used to be, their fleeces also are heavier and coarser.

But were our short-woolled native breeds to produce fleeces from which as much and as excellent *picklock* and *prime* could be selected by the stapler as formerly, would it ever manufacture into cloths of fine quality, fitted either for the home demand or the foreign market, according to the general improvements and manufacturing competition of the present day? We think not; nay, it would appear that in these superfine cloths short wool of English growth is almost inadmissible. We depend on our foreign supplies; we can import at a cheaper rate than we can grow the material best suited to the wants of the manufacturer, and that too without injury to the native wool-grower. Here, as in other commercial affairs, we see the dependence of nation upon nation, the benefits and blessings which arise from a free communication with each other, and from an interchange of those productions which each may justly boast itself of being able to supply, both at the cheapest rate and of the best quality. It is thus that civilised nations bestow, or ought to bestow, unrestricted by oppressive tariffs, their benefits interchangeably on each other. It is thus too that the human race at large becomes ameliorated, for commerce is more than the pioneer, it is one of the grand agents of civilisation; it opens the first path for the onward march of science and learning, and knits together distant nations in the bonds of amity and mutual interest.

It may be asked, since our native short wools no longer enter into the composition of fine broad-cloth, to what purposes are they now more especially devoted? Mr. Goodman, of Leeds, in a communication to Mr. Youatt, says, "These wools are now employed in flannels, army and navy cloths, friezed coatings, Petershams, bear-skin and other coatings, heavy cloths for calico printers and paper manufacturers, woollen cords, coarse woollens, blankets, East India army cloths, and other woollen articles, many of them adapted to the trade of the United Kingdom, and largely exported to North

and South America, the East and West Indies, Germany, and other places, besides for the same purposes being partially used in cassinets, baizes, bockings, long ells, carpets, druggets, &c." Here then we have a full demand for our *altered short* wool, or as some call it our *middle* wool; and though it yields no *picklock*, and sells at a lower price than it once did, yet taking the superior weight of the fleece into account, and the improvement and greater value of the sheep, the farmer is rather a gainer than a loser upon the whole; nor need he grudge the importation of the fine short wools, the more especially as their supply is absolutely demanded, and it is out of his power to meet the demand.

Let us first attend to the *short-woolled*, or if the term pleases better, the *middle-woolled* breeds of our island.

THE SHORT OR MIDDLE-WOOLLED BREEDS OF SHEEP.

We need not recapitulate what we have just said; our old short wool has altered its character, and all short wool used in the manufacture of fine cloths is of foreign growth.

Among our native *short-woolled* breeds (we use the term *short-woolled* because it is in common acceptance), the Southdowns have long stood conspicuous. It were idle, and more than that it would be fruitless, to attempt to investigate the original source of our short-woolled races, or to attempt to analyze the causes which led to their peculiar character of fleece, as distinguished from that of the long-woolled breeds of our island; yet it has often struck us that in the Southdowns (now greatly improved) we see the descendants of a very ancient lineage. Although they want horns, yet their mottled or dusky brown limbs and faces seem to show still "a trick of the wild blood," an impress which cultivation has not obliterated—tokens of a strain in which something of the wild original is still to be appreciated.* Perhaps this is fancy; however, for ages has this breed of sheep maintained its integrity on the great ranges of chalk hills stretching through Sussex, Surrey, and Kent. The Southdowns, strictly speaking, are confined to Sussex; they rise from the Marsh of Pevensey to the bold promontory of Beachy Head; they then trend westward as far as Shoreham, occupying a surface of about twenty-six miles in length, and six or seven in breadth, containing 99,840 acres. This tract is properly

* This brown colouring is by no means always confined to the face and limbs. Parti-coloured lambs, some half black, some with numerous rusty black patches, some entirely of a rusty black colour, are often the produce of parents whose fleeces are of a pure white, as if there was a lurking tendency in the blood to throw off the impress of long cultivation, and renovate the pristine characters of the race. The ease with which a rusty black stock might be raised is palpable. To prevent this is the breeder's care, and it is in spite of his efforts that the old blood breaks out.



SOUTHDOWN RAM.

denominated the South Down. From Shoreham the Downs gradually recede from the coast and traverse the western part of the county, bearing some points towards the north, and enter Hampshire between West Harting and Stanstead, near Petersfield. Their extreme breadth in Sussex is fifty-three miles, their greatest breadth seven, and mean about four miles and a half. The average height is about five hundred feet above the level of the sea; but Ditchelling Beacon is 858 feet, Firle Beacon 820 feet, Chantonsbury Ring 814 feet, Rooks Hill and Bow Hill each 702 feet, and Beachy Head 564 feet above that level. The Downs have a rich covering of short and delicate turf, containing large portions of wild thyme (*Thymum serpyllum*), and occasional patches of the common furze, the *Ulex Europæus*, in patches of thirty or forty acres. The whole district is without trees, except in some declivities, where the white thorn is found, and in some of the richer portions of Stanmer and Arundel parks, where thriving plantations of beech and other hardy trees have recently been made. The surface of the Downs is gracefully undulating; the northern escarpment is precipitous, whilst the southern declines gently, and westward of Brighton gradually blends with the lowland of the coast.

Such is an outline of the general characters of the Downs of Sussex, the nursery and congenial home of the breed of sheep in question.

Formerly the Southdown sheep were very indifferent; it is true that they carried very fine wool, but then the carcase was ill-formed, a disad-

vantage which more than counterbalanced the excellence of the fleece. They were small, thin in the neck, high in the shoulders and in the loins, down on the rump, with the tail set very low; the back was sharp, the ribs flat, and the fore-quarters narrow; yet there were materials to work upon, and besides, these sheep had some excellent qualifications; they arrived at early maturity, were extremely hardy, thrived upon scanty keep and short feed on the natural pastures, and the mutton was fine-grained and of good flavour.

Attempts were first made to improve the Southdowns by crosses with the Leicesters, a long-woolled sheep, but these attempts ended in utter failure, nor were crosses between them and the Merinos ultimately advantageous. It was by careful selections, and the keeping in view of a definite purpose in the choice of breeding stock that the improvement of the Southdowns was achieved. It is to Mr. Ellman of Glynde that the elevation of this breed to its unrivalled position in its own line as a hill sheep is due.

Mr. Culley, in his *Live Stock*, 1807, notices the exertions "of the ingenious Mr. Ellman, whose flock is already superior to that of most of his neighbours, both in carcase, quantity, and quality of wool." This enterprising and skilful breeder did not however content himself with mediocrity, and in the *Annals of Agriculture*, vol. xx., p. 224, Mr. A. Young thus speaks of Mr. Ellman's Southdowns:—"His flock, I must observe, is unquestionably the first in the country,

the wool the finest, and the carcase the best proportioned. Both these valuable properties are united in the flock at Glynde. He has raised the merits of the breed by his unremitting attention, and it now stands unrivalled." Mr. Ellman's own description of them is very unpretending. He says (*Annals of Agriculture*, vol. xvii.) they "are now much improved both in shape and constitution; they are smaller in the bone, equally hardy, with a greater disposition to fatten, and much heavier in carcase when fat. They used seldom to fatten until they were four years old, but it would now be a rare sight to see a pen of South-down wethers at market more than two years old, and many are killed before they reach that age." Doubtless the age is reckoned, as is usual with sheep, not from the time when lambed, but from the time of the first shearing, a point always to be borne in mind unless the contrary is expressed.

When any spirited individual commences a system of improvement he communicates a stimulus to others, and if he have the public good at heart, diffuses around him the means by which others may be enabled even to compete with himself. Certain it is that Mr. Ellman's improvements led to the rapid amelioration of the South-downs throughout the whole of their range; and now if we look at the quotations in the Smithfield market we find the estimation in which they are held.

Contemporary with and contributory to the improvement of live stock, alterations took place in agriculture generally, and among these the introduction of turnip husbandry was not the least important. By the adoption of the latter system not only could a greater number of sheep be fed in a given area, but greater abundance of food would be supplied to them; they would be better kept, and consequently developed in form and ripened at an earlier age than when the natural pasture was their only resource. Besides turnips other artificial food began to be raised, and the arable parts of every farm were cultivated for a succession of produce.

According to Mr. Ellman, the artificial food most advantageously resorted to in the beginning of spring, and soon after lambing, is green rye. It must be given however with a considerable degree of caution, as it is apt to produce diarrhoea, or even dysentery. To prevent this evil result the ewes should be removed every day to old pasture ground, and there allowed to feed for a few hours, and they should never be folded on rye at night.

At the end of May, the rye being fed off, or if not running to seed, the ground should be ploughed up for turnips or rape; rye-grass comes in succession after the rye, and affords an excellent supply until the latter end of June, when the

winter tares will come in. These should have been sown in rotation from the beginning of October to that of May on separate patches, so that one crop may succeed another, so as to afford a uniform and uninterrupted supply.

Tares, clover, and rape come on in succession; and lastly, for winter food come the turnips until lambing time, but not after that, lest they should be affected with diarrhoea, and consequently not thrive. Swedes are preferable if they can be sown sufficiently early.

The rams are usually admitted to the ewes about the middle of October, and remain with them for three or four weeks. A young ram may be assigned to forty ewes, but a full-grown ram to eighty. At this period, if the ewes are well kept, it is very probable that a considerable proportion of them will become pregnant with twins; if the farmer breeds from rams or ewes that are themselves respectively one of twin sheep, their produce is almost sure to be twins, for, as is well known, the tendency to fecundity is hereditary.

Great care is taken in Sussex of the ewes at the weaning time; they are either driven home or housed in sheds, constructed for them in the fields, and are thus sheltered from the inclemency of the weather. The loss consequently at this season is comparatively light, both as regards the ewes and the lambs, and the breeder has the additional satisfaction of feeling that he has done everything he could which would contribute to their comfort and welfare at a time of peril.

Mr. Luccock has calculated that not less than 864,000 sheep are fed on the Downs of Sussex; if this statement be even nearly correct it implies a rate of stocking not exceeded in any other part of England, excepting on rich marsh lands alone, nor could it be maintained were it not for the well managed cultivation of the arable part of every farm, and the great quantity of artificial food raised from it. Mr. Young states that Mr. Ellman on 500 hundred acres fed 700 ewes, lambs, and wethers in winter, and 1,450 of all sorts in summer, besides 140 head of horned cattle. With respect to wethers, the Sussex sheep-breeder does not burden himself with them; numbers are sold off when about six months' old, and of those that are kept the greater part, if not all, are sent into the Weald to be kept by the small farmers during the winter; the few retained by the breeder are fed during that season of the year far less upon turnips than upon grass. As regards the ewes, they are always or almost always disposed of at four or five years old, and before they begin to lose their teeth. The farmer prefers young ewes as breeders, as he finds by experience that their lambs thrive and fatten better than those produced by old ewes, however promising they may at first appear.

The average dead weight of the Southdown wether varies from eight to eleven stones, but at the Christmas show there are usually some pens in which the sheep average eighteen or twenty stones; but these are picked sheep and fed high for the occasion.

No sheep are more healthy than the Southdowns. They are seldom affected by the rot, nor do they often suffer from hydatids in the brain. This general good health is owing partly to the nature of their pasturage, their change of food, and the good fresh air of the breezy hills, and partly to their journeys of two or three miles twice a-day from the fold to the pasture, and from the pasture to the fold, a plan of treatment which the Leicesters would not bear, and one of the reasons why they will not succeed on the Downs.

To the alteration in the character of the wool of the Southdowns we have already adverted. We may here add that the hogget wool, that which is left on the sheep untouched till the second shearing, and which was always used as a combing wool, has decidedly become more valuable since the present system of management; while its length is very considerable, it is finer than the ordinary long wools, is far more disposed to felt, and is applicable to more numerous and more profitable purposes.

The degree of perfection to which Mr. Ellman raised the Southdowns, and the estimation in which his breed was held, may be inferred from the high prices for which his spare stock sold at different periods. In 1798 the Emperor of Russia, desirous of trying the effect of a cross of the improved Southdowns on the northern sheep, bought two of Mr. Ellman's rams at the price of 300 guineas, their value being estimated by the Duke of Bedford, who purchased two more for himself at the same price. In 1829 Mr. Ellman retired from his agricultural pursuits, and his flock was sold off by auction at the following prices:—770 ewes, varying from one-year old to full-aged, produced an average of £3 1s. 6d. each; 320 lambs averaged 36s. each; 36 rams averaged £25 each; 32 ram lambs £10 each; 241 wether lambs 21s. each; one ram sold for 65 guineas.

Though the Southdowns succeed best on our southern ranges of chalk hills, yet they have penetrated into almost every part of the country, and generally thrive where locality and soil suit them. The northern hills, however, where the Cheviots and black-faced breed prevail, are unsuitable for them. Crosses between the Southdowns and other breeds of middle-woolled sheep have been found to answer very well; and indeed in Western Sussex the prevalent stock is a breed apparently between the Somersets and the Downs, and heavier than the latter. In Hampshire the old black-faced race is crossed by the pure Southdown. The latter has either usurped the place of, or greatly modified the

old Berkshire, and this race prevails in many parts of Kent, while the Romney Marshes bred a breed of long-woolled and valuable sheep which has existed there time immemorial. The Wiltshire sheep is but a variety of the Southdown; and in Dorsetshire, Norfolk, Suffolk, and Cambridgeshire, crosses with the Southdown prevail; indeed the Southdowns are contending not unsuccessfully with the old breeds of those countries, and may perhaps if not supersede them curtail the extent of their range.

On the other hand in many parts of Sussex, Somerset and Dorset are kept for the sake of early lambs for the London market; these lambs are ready for the market often before Easter, while the Down lambs come to the market in June or July. In the vicinity of Petworth (a market town in the hundred of Rotherbridge and rape of Arundel) great numbers of grass lambs are fed for the metropolis. The breed there kept is the Dorset (a horned breed), and the ewes drop their lambs in December, and nearly to the time of yearning are kept on stubble grounds, then on turnips and artificial grasses. After the removal of the lambs the ewes are fed as high as possible—that is, if the farmer has not expended his food on the lambs—and put with the ram. Ewes impregnated at this early season are valuable to the house lamb farmer, who purchases them from the field lamb farmer, and if successful may count upon profit. It is we believe to this Dorset breed that Gilbert White alludes in his remarks on the Sussex sheep; he states it as very remarkable that “from westward till you get to the river Adur all the flocks have horns and smooth white faces, and a hornless sheep is rarely to be seen. But as soon as you pass that river eastward and mount Beeding Hill all the flocks at once become hornless, or as they call them poll-sheep, and have moreover black faces, with a white tuft of wool on their foreheads, and speckled and spotted legs, so that you would think the flocks of Laban were pasturing on one side of the stream, and the variegated breed of his son-in-law Jacob were cantoned along on the other. And this diversity holds good respectively on each side from the valley of Bramber and Beeding to the eastward and westward all the whole length of the Downs. If you talk with the shepherds on this subject they will tell you the case has been so from time immemorial, and smile at your simplicity if you ask them whether the situation of the two different breeds might not be reversed. However, an intelligent friend of mine, near Chichester, is determined to try the experiment, and has this autumn, at the hazard of being laughed at, introduced a parcel of black-faced hornless rams among his horned western ewes. The black-faced poll sheep have the shortest legs and the finest wool.”—(December 9, 1773.)

Since the time when Gilbert White wrote, great changes in our breeds of sheep, no less than in the extent and diversity of their respective localities, have taken place, and he would now find his black-faced hornless sheep in the western as well as the eastern parts of Sussex.

The great mart for the sale and purchase of wool in Sussex is at Lewes; a stock market is held every fortnight, and a wool fair is held on the 20th of July. A fair is held at Petworth, on the 20th of November, for sheep; at Chichester, on the 20th of October; at Lindfield, on the 5th of August; and at Finden, on the 14th of September.

Throughout a great portion of Kent, along the range of the North Downs, where the ground is open, and is covered with short pasturage, the Southdown sheep are extensively cultivated. But Romney Marsh and the adjacent tracts constitute the head-quarters of a long-woolled breed known as the Romney Marsh sheep. In some of the more eastern parts of the county a mixed breed is found between these sheep and the Southdowns. They are kept on the upland pasture grounds, and yield a good and serviceable wool. On that portion of Kent called the Weald great numbers of Romney Marsh lambs and Southdown wethers are fed during the winter. At this season of the year the grazing lands are covered with stock of different kinds, but throughout the summer months comparatively few sheep are to be seen.

In the county of Surrey the Southdown breed extensively prevails, and is well suited to the short feed of the chalk hills; but there are smaller varieties of this race on some of the wild and sterile heaths so abundant in this county. These small hardy sheep are celebrated for the excellence of the mutton; and among them the Banstead Heath sheep have long been famous. This small breed is clad in a short, thick, and close fleece—a circumstance of some importance—but the mutton is unrivalled. The Merry Monarch, Charles II., loved Banstead mutton; nor has it yet lost its reputation.

But besides the Southdowns and these small heath sheep, various other breeds are to be seen in Surrey, and among them the Dorset; not that the latter sheep are bred in Surrey, but the ewes are purchased in autumn by the light-land farmers, in order to rear early lambs for the London market, and in the spring, after the lambs are sold off, they are transferred to the graziers of Essex and other counties to be fattened, so that flocks of Dorset sheep are not permanently kept on any farms, although Dorset grass-fed lambs are sent in April and May from Surrey to the metropolis.

If we turn to Berkshire we there find the Southdowns prevalent, the old indigenous breed

having either been superseded by them, or so interblended by frequent crossing as to have lost its original characters. The chalk hills are in the almost exclusive possession of the Southdowns, but in the rich vales a heavier crossed sheep is found, and in some parts Dorsets are kept for the sake of early lambs.

The old Berkshire sheep was generally but not always horned; the chaffron was arched and black, the legs black or mottled, the wool was short and coarse. These sheep were tall and of large size; they were slow to fatten, but when fat the wethers weighed from ten to thirteen stones (of 8 lbs.), and occasionally much more. Prize wethers have been known to weigh as much as twenty two stones.

We may now follow the Southdown sheep into Hampshire. Here as in Surrey they have superseded an old stock, generally horned, which is no longer to be seen. Not that the Southdowns are altogether pure. They are more or less crossed with other breeds, producing a round-barrelled, short-legged animal, capable of thriving on short pasture and easily fattened. The Hampshire west country sheep are crossed with the Somersetshire breed. They are larger and coarser than the Southdowns, with more wool about the face and less black on the face and legs. Perhaps they do not bear stocking so closely as the Southdowns. Nevertheless they are valuable animals, and well adapted for good sheep-farms.

It is generally the custom of the Hampshire farmer to stock close, and feed the land off as clean as possible. When the food is all exhausted the farmer carries straw to the ground, and pens the sheep at night upon it. They are thus supplied with a comfortable bed, which being trampled into the ground and mixed with the dung, forms in its turn a very valuable manure; and in this manner, at little cost and trouble, the ground is cleaned and enriched. No sheep are so well fitted for this system of management as the Southdowns, or the breed in which their strain is prevalent. Early lambs are not in general reared; a few farmers perhaps may find profit in rearing for the early markets, in which case they part with their stock yearly. For this purpose Dorset ewes, or west-country Down ewes crossed by Southdown rams, are selected. In this county sheep and wool are of great importance to the farmer; and it has been calculated that the number of sheep, exclusive of those of the Isle of Wight, averages 516,000. Of these at a general valuation the ewes may sell for 28s. each, the two-tooth wethers at 24s., the lambs at 18s. The fleeces average 3 lbs. each, and the wool is worth about 1s. 2d. per lb.

With regard to the Isle of Wight, several breeds of sheep are there maintained, according

to the nature of the ground and the views of the farmer. On the ridge of hills which crosses the island from east to west, flocks of Southdowns, little inferior to those of Sussex, are found; but in more inclosed parts Somersets and Dorsets are kept for the sake of early lambs. Few, however, if any of these sheep are bred there. The ewes are mostly purchased forward in lamb, at some of the fairs in the west. These ewes are crossed with the Southdown ram, the lambs resulting from this intermixture being generally hornless, and having black faces and legs, closely resemble in appearance true Southdown lambs, and indeed pass in the market as such, although the Southdown ewes yearn so much later in the season, that no lambs of this genuine breed can possibly appear in the market. Southdown lambs, however, are deemed of far superior excellence to Dorsets or Somersets, consequently early so-called Southdowns meet with a good and ready sale. These lambs, it is true, are half Southdowns; but only on the side of the male parent.

Sheep are of great importance to the Isle of Wight farmer; and it is of consequence that his lambs be early, in order that they may be fattened off on his turnips, which would not keep for late yearned lambs; besides which, he has no water meadows or grass crops on which to fatten for the market lambs yearned even a few weeks after those produced by the Dorset or Somerset ewes. It is calculated that in this island the number of sheep kept exceeds 52,000, exclusive of 8,000 lambs. The fleece varies from $3\frac{1}{2}$ lbs. to 4 lbs., and the number of packs obtained averages 1,000.

We may follow the triumphant invasion of the Southdowns into Wiltshire, where they have completely superseded or modified the old horned race. The old Wiltshire sheep was evidently a mere variety of the Dorset, and was well adapted for the high chalky downs and wild pasture lands of the south-eastern portion of the county. These sheep, as we have said, were horned, the horns turning back over the ear; the head was large, the chaffron long and arched, the eyes large, the nostrils wide, the chest deep, the back straight, and the legs long and large boned; the wool was fine, and in considerable estimation. These sheep were hardy and active, and would bear a double journey daily to their pastures in the morning and their fold in the evening. They were, however, slow fatteners, but when fattened often attained to a very great weight. They were, moreover, excellent folding sheep, and rendered the ground well suited for crops of corn.

This breed extended from the Wiltshire downs into North Devon, Somersetshire, Berks, and Bucks, but is now obsolete. It was not a breed of which the farmer could keep a young stock with advantage. It was his aim to sell off his wether lambs,

or at least the greatest portion of them, soon after midsummer, and the remainder in the course of the succeeding year. They were fattened in various counties for the London market. Of ewes he was anxious to have a good store, for the sake of breeding, but he never attempted to fatten.

This breed, by repeated crossings and inter-crossings with the Southdowns, ultimately lost all its original characters. It merged, in fact, into the Southdowns, forming a variety scarcely to be distinguished from the genuine Sussex sheep, except perhaps by superior size, lighter colour, and a finer fleece, more particularly in the lowland pastures of the county, where these sheep are larger than their Down-fed relatives, and have a heavier fleece.

That this change was productive of decided advantage cannot be denied. Dr. Parry, in the *Agricultural Magazine*, August 1806, states that a Mr. Dike had a farm consisting of 230 acres of arable land. The flock until 1791 consisted of from 320 to 360 breeding ewes, which produced 300 lambs annually. After 1791, 430 Southdown ewes were substituted. These produced 430 lambs, and yielded in all an annual profit of £304 10s. more than had been obtained from the Wiltshire flock. In this instance the change was eminently advantageous.

Besides the Southdown sheep, flocks of crossed Merinos, that is, crosses of Merinos with the old Wiltshire breed, are still to be seen in this county. These sheep greatly resemble the true Merinos. They are hornless, and carry close compact fleeces of very superior excellence.

In Dorsetshire, Somersetshire, Devonshire, and Cornwall, Southdown sheep are kept in considerable numbers, and have more or less influenced the old breeds of those counties.

The pure breed of Dorsetshire is celebrated for the production of early lambs; and, as we have stated, the pregnant ewes are purchased by farmers in various parts of the country, who find their advantage in sending early lambs to the London markets. Both the males and the females of this breed are horned, and have white legs and faces, but when crossed by a Southdown ram, the lamb is generally hornless, and the face and limbs are clouded. (See our notice of the sheep of the Isle of Wight.)

The following short outline relative to the Dorsetshire sheep was communicated to us by a gentleman familiar with this peculiar and valuable breed:—

This breed, he says, prevails not only in most parts of Dorsetshire, but is kept also in the low pastures of Wiltshire and in Somersetshire. "It grows to a good size, say one-fourth larger than the Down, is of a longer contour both as to leg and body, is horned, white in the face and legs, moderate as to the length of wool, the fleece being close and



DORSET RAM.

heavy; grows to good mutton, but is not so quick in fattening as some other breeds.

"The Dorsetshire ewe at the due age is usually put to a Down ram very early in the season, say about July; and in a pregnant state large flocks are brought for sale to Weyhill Fair in Hampshire in September, whence they are purchased by dealers and farmers, and brought to the home counties, say Sussex, Surrey, and Hertford, chiefly for the sake of the early lamb, which is much esteemed in the London market. They are excellent milkers and nurses. After the removal of the lambs the ewes are generally grazed in the same locality, and made ready as soon as possible for the butcher."

The pure Dorsetshire sheep is long in the face, with the nasal bones arched, and the forehead tufted with wool. The horns of the male are large, stout, and boldly spiral; those of the female are smaller. These sheep fold well, and the wethers when three years old average from 16 to 20 lbs. the quarter.

The early grass lambs are dropped in December or in the beginning of January, and are put with the mothers into dry, warm, and well-protected enclosures. Here the ewes are supplied with turnips, hay, and other food, so that they may have a good flow of milk. This, indeed, is very important, insomuch that from time to time the farmer examines the flock one by one, in order to ascertain the condition of the udder.

In this county many farmers rear house lambs on an extensive scale. Lambs for house rearing are dropped in September, the ewes, being for-

warded by means of high keep, having been put to the ram in April. For the purpose of rearing house lamb—one of the luxuries of modern days—it is requisite to have a building purposely constructed with every attention to warmth, comfort, and convenience. Internally this building is divided into numerous coops, for the reception of the lambs according to their ages.

"Every evening the ewes are turned into the respective divisions of the lamb-house, where each mother speedily recognises her own offspring, and affords it suck. They remain together until the following morning, when they are separated, and the ewes driven back to the pasture.

"About two hours after the departure of the mothers, those ewes which have lost their lambs, or whose lambs have been sold, are driven into the house, and held until their udders are perfectly emptied by the lambs, when they are taken away and placed in their own separate enclosure. At twelve o'clock the natural mothers are brought again, and remain for about an hour or two. At four o'clock the foster mothers are again brought, and compelled to pay another visit of an hour's length; and at eight o'clock the natural mothers return to pass the night with their offspring.

"The most scrupulous attention is paid to the cleanliness of the place. The lambs are supplied with good wheat straw for them to nibble, and pieces of chalk to lick.

"The ewes are kept in an adjacent and well-sheltered pasture during the day, and are plentifully supplied with green food, grains, turnips, rye,

tares, clover, &c.—the food being varied, so that the sheep are not only kept in the best health, but their flow of milk is maintained in rich plenty; for the farmer well knows that, should the milk of any ewe fail, even for a short time only, the lamb is lost to the market, and that no system of forcing can ever afterwards restore him to the requisite degree of condition.

"At the age of about eight weeks the lambs are fit for the market. They then sell at high prices, which are kept up in the markets through November, December, and January."

The early forcing of lamb, to meet the demands of luxury, is analogous to the early forcing of various fruits—strawberries, cherries, grapes, &c. &c., for the same express purpose. In both cases the ordinary course of nature has to be hurried on by artificial means, involving skill and expense; and in both, failures from time to time occur. It has been our lot to hear persons decry both house lamb and the forced fruits of the hot-house; but in every instance from a feeling of envy or vexation because such *recherché* viands were too expensive to be within the means of a man of "the golden mean"—neither rich nor poor. Yet, forsooth, the grumbler wore superfine broad-cloth! What luxury! Surely the peasant, clad in coarse hodden gray, might turn round upon him, and say, "Such luxurious refinement of dress is utterly contemptible; it is neither so warm, nor so strong, nor so durable, nor yet so simply natural as the fabric I wear; see the results of luxury and vain-glory." Who is to set bounds to the progressive demands of refined, or as some would call it, luxurious civilisation? It is to these demands, which go beyond a straw-thatched hut, "a radish and an egg," a coarse garment and sordid attire, that commerce owes its very existence, the arts their vitality, science her very basement. I may say with Horace—

"Non ebur neque aureum
Meâ renidet in domo lacunar;"

"neither does ivory, nor a fretted ceiling inlaid with gold, gleam in my abode." But wherefore not in the palaces of the wealthy and the mighty? and, by a parity of reasoning, why should not their tables show a succession of viands (in themselves simple enough), proving that the art of the breeder and the gardener, when called into requisition, can produce the flesh and the fruits of summer, even in our northern isle, while the snow buries the fields and the rivers are locked up by frost? In each instance, industry, capital, enterprise, skill, and experience are called into operation; and the production of what may be, perhaps is, for the gratification of the few, tends in reality to the advantage of the many. Civilised life is a series of progressive advances in the path of refine-

ment and luxury. A gentleman of "the golden mean" in the present day would turn with disgust from the feast of a noble three or four hundred years ago; and the peasant or labourer, who now asks for good wheaten flour and a "bit of meat," would once have thought black bread and dried stinking stock-fish a sumptuous repast. As for our esculent garden vegetables—those which the cottager rejoices to see flourish in his little patch of ground—they were unknown; yet now the cottager will strive with his rural competitors as to who shall produce the finest and earliest gooseberries, peas, beans, carrots, cabbage, and brocoli; aye, and more, he will boast his pig, his rabbits, and his poultry. Wherefore, then, shall forced house lamb and forced fruits, because luxury (that vague expression, that indefinite word) demands them, be regarded, by those who think themselves *not* luxurious, with a mixture of contempt and envy? Simply because they are themselves utterly ignorant of their own history—the history of the dawn, the checks, the progression, and the triumph of *refinement*, with its myriad of wants—of *civilisation*, never stationary, and ever craving, of which our small island, within the range of authentic documents, affords a most instructive and impressive example. History, according to the general acceptation of the term, has little to do with such things. It is limited, in the views of the school-man, to a parrot-like enumeration of kings, and the dates of their births and deaths; while what the people were—how they advanced in the comforts of life—how phase succeeded phase in the changing order of circumstances affecting the well-being of the community at large—the origin of laws, customs, rights—the progress of arts, literature, and science, are things undreamed of and never for a moment mooted. Our forefathers, in the good old days, never thought of house lamb—the demand for it is altogether modern; but while this demand continues, it will be the interest of the farmer to meet it. Thus, as Mr. Culley says, "are invention and industry exerted to the utmost to supply the wants of luxury."

A breed of sheep between the Downs and Dorsetshire has been lately making considerable progress; it is very valuable, grazes well, grows to a good size, and produces a finer and heavier fleece than the pure Dorset, and averaging from three and a-half to four pounds.

A small heath breed of sheep is found in the Isle of Portland, but though somewhat esteemed for its flesh, it is little cultivated, and scarcely requires express notice. It is horned, and black or mottled on the limbs and muzzle.

In Somersetshire, various breeds of sheep are kept, according to the localities upon which they thrive most advantageously; among these we may again mention the Southdowns; there are also many

improved Wiltshires; Dorsets are very numerous, more particularly in the south-east parts of the county, but are by no means restricted to those districts. Devonshire Bampton, Leicesters, and others are also to be seen.

The old Somerset horned breed has been greatly crossed by the Southdowns, and is consequently much modified; the ewes were excellent milkers, and noted for producing early lambs. A variety of this breed was once celebrated under the name of the Mendip sheep, from its inhabiting the Mendip range of hills and Moorlands. This range stretches from west by north to east by south, and is separated from the hills about Bath and Bristol by the narrow valley of the Yeo, a small stream which flows into the Bristol channel by Weston. They extend at their western end to the coast, and unite at their eastern extremity with the hills near Frome. The length of the Mendips may be estimated at twenty-five miles, their breadth between Stoke Rodney and West Harptree at six or seven. This chain, according to Conybeare and Phillips, "consists of a central axis of old red sandstone, flanked on its opposite declivities by parallel bands of mountain limestone, dipping from it in opposite directions in angles varying from 30° to 70° . This central axis is not, however, visible throughout its whole course, being occasionally overarched and concealed by the calcareous strata; but it appears in four ridges, forming the most elevated points of the chain, and disposed at nearly equal distances through its length. The cavern of Wokey Hole, and the defile of Cheddar cliffs, with its long line of stupendous mural precipices, are certainly among the most magnificent objects of this kind in Britain, and are the well-known features of this chain." The cavern at Wokey, it may be added, is not in the mountain limestone, but in the calcareo-magnesian formation which abuts against it, near the foot of the chain on every side. Of English caverns it yields only in extent to those of the Peak of Derbyshire.

It was then over these hills that the Mendip sheep roamed; they much resembled those of Exmoor; they were small, horned, and wild, with finely flavoured flesh, and from their hardiness throve well on the moors and hills, contented with the hardest fare. Their wool was fine, but the fleece had little weight, a circumstance of no import, as it was far from being of primary consideration. Like the Dorsets and the old Somersets, these sheep were said to be capable of breeding twice in the year, and consequently their lambing time, granting that the system of breeding from them twice annually was not pursued (and its policy is very doubtful) would be regulated almost at pleasure.

At the present day, few, we may say no, genuine Mendip sheep of the old stock are to be seen. The Mendip range has become gradually more and more

enclosed, and its wild tracts more limited in extent. As these changes in the surface of the land took place, parallel alterations occurred in the characters of the sheep; and not only so, but their numbers rapidly diminished. A few years sufficed for the absorption, as it were, of the Mendips into a mingled race, in which the strain of the Southdowns prevails.

The hilly district called Porlock, occupying the western extremity of the county beyond Minehead, possesses a small, short-horned, wild, and active race of sheep, of which little is definitely known. It is very probable that they closely resemble the old Mendip breed.

In the vale of Taunton, and some of the richer parts of the county, Leicesters, and Devonshire Bampton, often called *Notts* or *Natts*, are kept; hence a good deal of long wool is grown in this county. In 1828 Mr. Hubbard calculated the packs of short wool at 5,200 (formerly they amounted to 9,400), and of long wool 5,200 (formerly none).

With respect to these Devonshire Bampton sheep, we may observe that a breed called *Notts* or *Natts* formerly prevailed in various districts, in many points resembling the Western Down sheep. They were polled, and middle woolled, but within late years their characters, from repeated crossing with the Leicesters, have undergone great alteration, and their wool has become long and fine, and the fleece greatly increased in weight; in fact, the Bampton now take their place among the long-woolled breeds. They are good sheep, and come at an early age to maturity.

Looking at Devonshire generally, we find, as might be expected from the varying characters of the land, that it possesses several breeds of sheep. The wilds of Dartmoor and Exmoor present us with sheep in many respects not unlike the Dorsets, only that they are smaller; perhaps they are the same as the old Mendip sheep—the relics of a hill-race once prevalent over the higher hill ranges of the south-western portion of our island. These sheep are generally, perhaps not always, horned; they have white faces and legs, are narrow and flat sided in the carcass, small boned, slender in the neck; when fat they average from nine to twelve pounds per quarter, and by many their flesh is esteemed excellent, some indeed compare that of the old wethers, when properly kept, to venison. But be this at it may, great quantities of this mutton, and more especially since the facilities of carriage afforded by the railroad, are sold in the London markets; indeed shops devoted exclusively to the sale of Devonshire produce, including mutton, poultry, eggs, and clouted cream, have been within the last few years established in the great metropolis. It is principally from the neighbourhood of Oakhampton that the very small Dartmoor mutton is obtained.



EXMOOR RAM.

The mountain sheep of Devonshire are extremely hardy, and many remain throughout the whole of the year, exposed to the severities of winter on their elevated heath-clad pastures. The ewes, however, are taken at the yeaning time into enclosures, often on the lower grounds, where they find good pasturage, but the wethers, except in very severe winters, when they are likely to be buried by snow-storms, are left altogether at large.

Recently it has become a practice to cross the ewes with rams of the Leicester breed, and feed them on the low grounds; the half-bred lambs often become in July as large as the full-grown sheep of the original moorland breed, and at the same time lose nothing in excellence of flesh, while the fleece is materially improved both in quality and weight. This observation applies both to the Exmoor and Dartmoor sheep, which may be said to be in a transition state between their ancient condition, and rank amidst the improved and cultivated breeds of our island. The rot is little known on the pasture grounds of the forest of Dartmoor, but in the lowlands it is a common disease, especially where the meadows are wet; hence the farmer resorts much to the higher pastures even with his half-bred improved sheep, and is too apt to expose them to the rains and mists of autumn on the bleak hills, where the old hardy breed alone could withstand the inclemency of the season.

The Southdown breed has not made much progress in Devonshire, though some farmers have succeeded in their cultivation. The food of the heath-clad moors is not congenial to them, nor are

they better fitted for the humid vales. There are, however, localities on which, under proper management, the Downs would thrive, and on the folding system benefit the agriculturist. The following table will show the principal breeds now prevalent in Devonshire, and their outstanding qualities:—

NAME.	CHARACTERS.	Age when killed. Months	Average weight per quarter. lbs.
Exmoor	Horned, legs and face white, wool moderate	30	10, 12, 15,
Dartmoor	Do. do.	do	" " "
South Devon Nott.	Brown face and legs	30	16
Bampton Nott.	White face and legs	32	28
CROSS BREEDS.			
Old Leicester with Bampton	White	24	30
Old Leicester with Exmoor	White	36	24
New Leicester with Exmoor	"	24	18
Do. with South	"	20	20
Do. with Devon	"	20	24
Do. with Bampton	"		

To this we may add the excellent observations of Mr. Youatt on the sheep of his native county, which will serve to show the alterations that have already taken place, and are still in progress. "In very few counties in England has so complete an alteration taken place in the character and produce of the sheep as in Devonshire. When Mr. Luccock compiled his table in 1800, he stated he number of short-woolled sheep to be 436,850, and that of the long-woolled sheep 193,750. The number of packs of short wool were 7,280, those of long wool 6,458. The number of packs of short

wool has now diminished to 2,275, but no satisfactory account has been obtained of the increase of the long wool.

"The fleece of the Dartmoor sheep, as well as the carcase, has been essentially altered by a cross with the Leicester. The wether at three years old will now average 24 lbs. the quarter, and the fleece will weigh $6\frac{1}{4}$ lbs. with the yolk. The fleece has also improved in fineness and softness of fibre, and is more useful for many important purposes."

Cornwall, we may here observe, is another county in which, owing to the introduction of the long-woolled Leicesters, the old characters of the native sheep have been almost, if not altogether, lost. Formerly the sheep of Cornwall were a small, wild, short-woolled breed, not unlike the old breeds of Dartmoor and Exmoor. Many had horns, others were polled; and many had black or dun-coloured faces; their flesh was fine, and held in high estimation. Though faulty in contour, these sheep were light, active, and agile, and fed on the downs, heaths, and sandy hills, delighting in the short grass and the aromatic plants abounding in such localities. These sheep reached maturity at about four years old, and the average weight of the quarter was about 14 lbs.

These sheep are now restricted to isolated spots—they are in fact seldom to be seen in their purity. The stock has been crossed and re-crossed with the Leicesters, and a blended race, in which the characters of the latter prevail, has been the result, inasmuch that the Cornish sheep are now long-woolled. In 1800 Mr. Luccock estimated the number of short-woolled Cornish sheep as amounting to 203,000, producing 3,382 packs of wool; but in 1828 Mr. Hubbard states that the Cornish flocks yielded 5,920 packs of long wool, and notices neither short-woolled sheep nor their produce.

Among the principal breeds of short-woolled sheep the Ryeland must not be forgotten. This breed, once the pride of Herefordshire, received its appellation from a district of that name, in the southern part of the county, where much rye was grown, and where these sheep were bred in large numbers. It is now however not to be seen in its pure state; the old breed has been crossed with the Leicester, and the wool has changed its character, and instead of being short and fine, is of middle length and adapted for combing.

The genuine Ryelands were small-polled sheep, with white faces, the wool growing close around the eyes. The legs were small, the bone light, and the carcase round and compact. The fleece averaged from $1\frac{1}{4}$ lb. to $2\frac{1}{4}$ lbs.; and the weight of the wethers per quarter was from 14 lbs. to 16 lbs. This breed was extremely hardy, patient of hunger, and capable of thriving on very scanty fare.

Sir Charles Turner, bart., in a communication to Mr. G. Culley, thus describes the routine of treatment to which the Ryelands were habituated in his day:—

"The lambs when weaned from the ewes, about midsummer, are put upon old clover and rye-grass, or dry pasture land, and wintered the same, except in snow or very severe winter, when they have a little hay or pease-haulm.

"The wethers are generally put from the store-sheep at Michaelmas, when they are past three years old, kept well in the winter, and slaughtered fat the next summer at four years old. Some turn them to feed sooner, but that is when the stock is too large for the keep. The sheep certainly feed better at four years old than sooner, and the flesh is better; indeed they are put to feed at any time that suits the owner, but should be near fat before winter, or turned off to feed as above; then they are put to turnips or good dry pasture, and changed often; sometimes kept in the house and fed with hay and oats, having water always in a trough by them; this last plan is expensive, but the mutton is excellent, and the weight of the flesh from 50 lbs. to 80 lbs. A Ryeland sheep that will weigh 50 lbs. when good fair mutton, is often fed till he weighs 80 lbs. The store-sheep (except yearlings and two-years old), upon corn-farms, and where the wool is finest, are put in the sheep-cot at night and all the year round, and their racks are filled with pease-haulm, wheat-straw, barley-straw, or any other dry food, which they eat and convert into manure; this manure enables the farmers to raise good crops of barley, &c.; and the sheep pasture by day on old clover and rye-grass, dry pasture, fallow, stubble, &c., but are always kept very lean, and graze quite short. When there is not convenience for putting them into the sheep-cot by night all the year, they do it from the beginning of winter to April or May, when the lambs are able to lie out by night. The ewes must be kept in by night at the yearning time, and while the lambs are very young, or the cold nights will kill the lambs, their wool is so very short; but if they are healthy at a week or fortnight old, they will bear to be out at night.

"The sheep are pastured upon commons, open fields, or enclosures, provided the land is dry and healthy for sheep, and when there is no convenience of putting them in a sheep-cot by night at yearning time. If the ewes can be within doors the lambs bear the cold better; but if they cannot be put in the house at that time, they should be often visited, and put where they will be best sheltered from the cold."

As we have said, this old breed is now intermingled principally with the Leicester, and the fleece has become accordingly altered; it has both

thickened and lengthened in the fibre, and is fitted for other purposes than those to which it was applied while it retained its character as a short-wool pre-eminent for felting qualities. The present Herefordshire or Ryeland sheep is a compactly formed and handsome animal, and exceeds the old breed in bulk and stature; its limbs are fine-boned, its mutton is excellent, and it thrives on pasturage unsuited for the pure Leicesters.

Crosses between the Southdowns and the old Ryelands were once tried, but without any advantage; and when the Merinos were in vogue crosses were tried between them and the latter, but no permanent mixed breed appears to have been established.

In order to show the change which has taken place within the last few years in the character of the Hereford breed, we may observe that this county, in 1800, contained 500,000 short-woolled sheep, furnishing 4,200 packs of wool, the weight of the fleece averaging 2 lbs. In 1828, the number of packs of short wool had diminished to 2,800; but no fewer than 5,550 packs of long wool were grown in Herefordshire, the average weight of all the fleeces being 4 lbs. "Such was the change effected in the very territory and domicile of the finest-woolled sheep that England could produce. This fact speaks volumes as to the revolution which is going forward, and plainly points out the farmer's interest and duty."

Formerly great numbers of the Herefordshire breed were reared in Gloucestershire, and a valuable short-woolled breed tenanted the extensive forest of Dean. The importation of foreign short-wools, from which, at less outlay, a superior cloth could be made, led to the neglect of these sheep, or rather to their intermixture with other breeds, and no short wool is now to be obtained from that district. Still in the hills of the northern and eastern parts of Gloucestershire short-woolled sheep of Herefordshire extraction are to be seen; but in other parts of the county long-woolled Leicesters and half-bred Cotswolds prevail. The same observation applies to Monmouthshire, where formerly a native short-woolled race existed, varying in size according to the nature of the situation. The mountain sheep were small, and produced very superior mutton when fattened; the fleece was short and fine. In the more cultivated and lower districts the sheep were rather larger, and were evidently intermixed with the Ryelands.

Short-woolled sheep are still to be seen in the hilly districts, and in some parts the Southdowns are not unsuccessfully cultivated; but throughout the county generally the long-woolled Cotswold and Leicester sheep are prevalent, and long wool is the standard growth of the county. A similar change has taken place in Worcestershire. Formerly a short-woolled sheep, with the face mottled,

and as it is believed of Welsh origin, was prevalent, and many Ryelands abounded on the waste grounds; but at the present time a long-woolled race, between the Cotswolds and Leicesters, is chiefly cultivated. But in some places the breed is a mixture between the Leicester ram and the old gray-faced Shropshire ewe.

In Shropshire the Cotswolds and Leicesters have not only gained the ascendancy, but have modified the old breeds, some of which were once celebrated for the fineness of their wool. The old Shropshire sheep were horned, with black or mottled faces and legs; in stature they equalled the Southdowns, but were not so compactly made, and were longer in the neck. They were active and hardy, and thrived on scanty pasturage. The fleece of the wethers averaged $2\frac{1}{2}$ lbs., and the carcase weighed from 14 lbs. to 16 lbs. per quarter. Between this sheep and the Dorset a cross breed, much heavier in the carcase and also in the fleece, was cultivated by many farmers, although the mutton was of inferior quality and the fibre of the wool coarser; the increase of weight however, both in carcase and fleece, was deemed advantageous, and a counterbalance to a somewhat depreciated rate of price per pound.

In the hilly districts a smaller variety with finer wool was found; the flesh of this breed was excellent, but the carcase seldom weighed more than 12 lbs. per quarter.

In the Clun district, formerly considered as a part of Wales, a small polled sheep with white face and legs prevailed; the fleece averaged $2\frac{1}{2}$ lbs. and the carcase 12 or 14 lbs. per quarter.

Of the old Shropshire breeds of sheep that of Morfe or Morf Common was once the most celebrated, especially for the fineness of its wool, in which it scarcely if at all yielded to the Ryelands. The Morfe, situated on the left bank of the Severn below Bridgnorth, is a tract of waste land five miles in length and from two to three in breadth, and has from ancient times been noted as a sheep-rearing district. The true Morfe sheep had small horns, and had a black or mottled face and legs; the fleece was very fine, and weighed about 2 lbs.; the weight of the wether was about 13 lbs. per quarter, of the ewe 9 lbs. When the Merinos were first introduced into England, crosses between them and this breed were expected to succeed, and Dr. Parry commenced his experiments with Morfe ewes, which however he soon exchanged for those of the pure Ryeland breed. Why the Morfe breed should not have answered Dr. Parry's expectations we cannot tell; certain it is that at one time the wool of the Morfe Common sheep was celebrated for all those qualities in which a fine short staple ought to excel. Like all the old races of short-woolled sheep the Morfe breed has become greatly modified, and indeed we may say the same of the

old Shropshire sheep generally. On the Longmynd range small horned sheep with dusky faces may yet be seen, and on the hills adjacent to Wales a Welsh breed exists remarkable for shortness of limb; it is polled and white faced, and its fleece is heavy but coarse.

In the neighbourhood of the hills and commons a breed between the Southdown and Longmynd is in estimation; it is very hardy and bites close, is of moderate size, and bears useful wool. In other parts various crosses of the Cotswolds and Leicesters prevail, insomuch that the returns of wool from this county are principally of the long staple. In 1828 the packs of short wool were 2,400, those of long wool 5,500; and since that date the short wool has been on the rapid decrease.

If we turn to the adjacent county of Staffordshire, we find the sheep to be of various characters and crossed by breeds of almost every kind, and especially by the Leicesters; hence the native stocks have merged into others, so that few of the old pure races are now to be seen. These old races were short-woolled; one of them was known as the Cannock Heath or Sutton Coldfield sheep; and the breed, though not in its pristine purity, may be said still to exist. It is polled, and gray, brown, or black faced, with dusky legs, and bears a close compact fleece, inferior in quality to that of the Southdowns. The limbs are slender, the mutton is good, and the sheep fatten on a moderate supply of food, becoming ripe for the butcher at the age of three years. The wethers average from 15 lbs. to 20 lbs. per quarter, but may be fed to a greater weight. An improved breed of this sheep called the Tedderley resulted from the efforts of Sir Edward Lyttleton; its wool was of a finer quality than that of the old stock, and the weight of the carcase was superior, though the fore-quarters are light compared with the hind-quarters, which were heavy. The ewes were good breeders and nurses, and the lambs were ready for the butcher in May and June.

Crosses were afterwards made between the Tedderley stock and the Southdowns and Leicesters. Had the demand for home-grown short wool continued, the former cross would no doubt have proved most advantageous; there was an affinity between the two breeds, and the intermixture was promising; but long wool began to be alone required from the English grower. The cross however between the improved Cannock Heath or Tedderley breed and the Leicesters, from which much perhaps was expected, was not altogether successful. The weight of the carcase was increased, the wool was converted into long staple, but the sheep were delicate and unfit for their pasturage.

On the commons of West Staffordshire a light black-faced sheep was prevalent, and still exists, although considerably modified. The males were

horned, and the wool was fine. Various crosses have contributed to the amelioration of this stock, without obscuring altogether its original characters; yet these will soon disappear, perhaps have now almost entirely become effaced, for flocks of Leicesters are spreading over the county; and though on a few farms Sussex Southdowns are reared, long-woolled sheep are in the ascendancy, and long wool is the principal growth of Staffordshire.

Formerly Cheshire reared short-woolled sheep, and the flocks fed on the heaths and commons may be still placed among the short or middle-woolled varieties. Among these the Delamere breed may be noticed; these sheep are small, have brown, black, or mottled faces and legs, and most have small horns; they weigh about 10 lbs. per quarter, but the mutton is excellent, and the wool is short and very fine, the fleece seldom exceeding 1½ lb.

In other parts of Cheshire are to be found sheep of all breeds and crosses; they are fed chiefly for home consumption, and purchased from the adjacent counties. Cheshire is not a sheep district; it is divided into small farms, and cheese is its staple agrarian produce. Sheep-husbandry, in the true sense of the term, is in fact little practised in this county, and the few flocks that are kept are sold off as soon as they return any profit, and seldom remain on the farm over the year.

While noticing the breeds of sheep, or rather the short-woolled breeds, peculiar to the counties bordering upon Wales, it may be as well, before proceeding northwards, to cross the boundary line (now merely imaginary) which divides England and the Principality, and take a survey of the principal races of sheep for which this latter section of our island is or has been celebrated. Wales has long boasted her mountain sheep, not without cause; and Welsh mutton is deservedly celebrated. It is small, fine-grained, of very superior flavour when in season, and sells at a high price in the London market, where, owing to the quick transit of railroads, much more is received than formerly, when the sheep had to be driven on foot and pass from hand to hand before they reached their ultimate destination. The Welsh sheep generally speaking are wild, restless, and wandering, and not easily confined in small or even moderate enclosures, for ordinary fences or hedges are seldom capable of restraining them, nor do they submit, like tamer sheep, to the discipline or management of the shepherd. Some of these sheep are horned, others are hornless. They vary too in colour, from white to dingy brown or gray, and black individuals are not unfrequent. They are active, vigorous, and surefooted, and clamber among the mountain rocks with the utmost address. Their wool is short, but varying in the quality and weight of the fleece according to breed or pasturage.



WELSH SHEEP.

Turning first to Glamorganshire, a maritime county of South Wales, it may be observed that this county is covered with mountains, some of which branch off from the principal range that extends east and west through Brecknockshire into Caermarthenshire. The centre of the county is occupied by a group of mountains branching off in every direction except the north, and having its chief extension from east to west, from the valley of Cynon to that of the Neath. On the south of this range the country is fertile and well adapted for horned cattle; but on the north the hills yield a coarse and scanty pasturage, well fitted for the hardy breed of sheep which time immemorial have occupied this tract and the adjacent districts. The native sheep are remarkable for a small head and a long, erect, and somewhat deer-like neck; the fore-quarters are light and the breast and shoulders narrow, as are also the back and loins; the legs are long and small boned; the head sometimes horned, sometimes polled, and the colour variable. These sheep are active, unquiet, and restless. Their fleece averages 2 lbs., and the quality of the wool is good. Many flocks, however, have the wool deteriorated by the number of kemps or hairs which grow amongst it. The sheep are regularly shorn in May or June; but in many places the newly grown wool is clipped close about the neck and fore-quarters at Michaelmas, a practice the more excusable, as this wool would be all torn away during the autumn, winter, and spring, in consequence of the animals forcing their way through briars, rough thickets, and masses of furze in search of food.

Many farmers shear the lambs in the first summer, a practice by no means to be commended, inasmuch as they require a warm coat to serve as a protection against the chilly breezes of autumn and the severities of winter. It is true that the thorns of the thickets and briars may make the coat somewhat ragged, but this is of little consequence in comparison with their comfort and health, besides which tegg or hogget wool is more valuable than that of the lamb. We believe that this plan of lamb shearing is greatly on the decline, and abandoned by the best farmers. Another plan, now almost if not quite obsolete, is that of weaning the lambs at an early age for the sake of the milk of the ewes. It was once a general custom to milk the ewes morning and evening from the middle of May to September. Each ewe on an average yielded two pints of milk per day, from which in the course of the season about twenty pounds of cheese were obtained. Generally the ewes' milk was added to a considerable proportion of cows' milk, and thus the cheese was of a *mixed* kind, and less rich than that procured from ewes' milk alone. This custom, though it may linger in some isolated spots remote from the influence of progressive improvement, is given up by all good farmers. It cannot be too much reprobated. In the first place, the lambs being stinted in their natural nutriment, do not advance as they ought in growth and strength, and consequently are afterwards less valuable than they would have been under a better system. In the second place, the drainage of the ewes till autumn reduces them to a low condition at a time in which they ought to be in full health and vigour;

hence, though few comparatively prove barren, it is very seldom that twins are produced, and when this occurs they are feeble. As we have said, however, the practice of milking the ewes, once common in Wales, is becoming extinct, and is only adhered to by those who pertinaciously cling to old habits, regardless of the dictates of reason, and swayed by prejudice.

It must not be supposed that no attempts have been made towards the improvement of the Welsh sheep, nor that these attempts have not been more or less successful, especially in the vales and lower grounds, where the sheep exceeded in size those of the hills, and produced a heavier fleece. In due time the practice of turnip husbandry began to be introduced, enabling the farmer not only to keep more sheep but sheep of a heavier breed, and to fatten them more expeditiously. It was then that the vale sheep began to be crossed with Leicesters and hardier though larger Cotswolds, till at length these breeds in most parts of the vale of Glamorgan acquired the ascendancy; so that now, instead of the native race, Cotswolds and Leicesters mingling in various proportions are almost exclusively to be seen there.

In some parts crosses with the Southdowns have answered well; nor have the Cheviots been unsuccessfully cultivated. They require to be brought from the hills to the low lands in winter, and defended from the rigours of the season. By care and good management they may be made to answer, but they will never supersede the mountain sheep of Wales in its own stronghold.

These mountain sheep abound in the high lands of Brecknockshire, and are the chief dependance of the hill farmer. From the dryness of the soil, and from better and finer herbage, these sheep are superior to those of Glamorganshire, and yield better wool. The ewes are brought down from the hills in winter, and not taken back till the cold weather has ceased, and the lambs are strong enough to bear exposure. In this county within the last fifty years agriculture has greatly improved. More manure is put upon the fertile lands, cropping is better understood, and turnips generally cultivated. The same observations apply to Caermarthenshire also, in the valleys of which Cotswold and Leicester sheep, but particularly the former, are now naturalized, while the original mountain sheep retain possession of the hilly tracts. We may, in fact, say the same as regards the counties of South Wales generally. Wherever a spirit of improvement manifests itself, we find in the enclosed vale-farms sheep of different breeds and various crosses, more or less valuable; but the mountains are tenanted by the old Welsh breed, varying in minor particulars, according to the care bestowed upon the flocks during winter and the sufficiency of the pasturage. In many

districts these sheep were once sadly neglected; nothing was done for them during the winter, no shelter was provided for them against storms, and serious losses, especially among the lambs and old ewes, were of common occurrence. This mismanagement of the hill sheep was notorious in Cardiganshire; but within late years a great alteration for the better has taken place, as in other parts of the Principality, and the march of improvement, not only in affairs relating to husbandry, but in general knowledge, is almost everywhere rapidly progressive. In 1809 Mr. Luccock calculated that South Wales produced 5,700 packs of wool of short staple; but a considerable quantity of long wool is now grown, while the quantity of short wool has perhaps somewhat diminished. If we turn from South to North Wales, we find the mountains occupied by small sheep, more or less allied to those of South Wales—wild, active, and hardy, and celebrated for the excellence of their mutton. In Montgomeryshire, for example, great numbers of hill sheep are kept. In the south and west a small white-faced breed prevails. During the summer these sheep are pastured on the hills; but on the approach of winter the ewes and lambs are brought down into the low grounds for the sake of food and warmth. The wethers, however, are mostly left to provide for themselves on the mountains, without any artificial shelter or provision for their support.

In the north-east portion of the county a small black-faced breed is found, and is much valued on account of its hardiness. These sheep are not in perfection till upwards of four years old.

The fleece of both breeds of hill sheep is very fine, but of little weight, averaging about $1\frac{1}{2}$ lb. In the valleys a larger breed of sheep, crossed by the Shropshire and other races, is cultivated. The fleece of this valley breed weighs about 2 lbs., and the carcase gives 14 lbs. per quarter; that of the hill sheep about 10 lbs.

In Denbighshire and Flintshire the sheep are of various breeds, and not very numerous; as elsewhere, a small race prevails on the hills, but in other parts English sheep of various crosses and various qualities are cultivated. In Merionethshire, a mountainous district, sheep-farming is the staple business of the agriculturist, and the breed of sheep are celebrated. Those sheep of pure strain are of small size, with light bone, and their mutton is pre-eminent. The weight rarely exceeds 10 lbs. per quarter, and the fleece averages $1\frac{1}{2}$ lbs., but its quality is good, and it is largely used in the manufacture of Welsh flannel. The sheep of the best race and purest strain are supposed to be those bred at the base of Cader Idris, and the rams from that quarter are in general request.

It is the practice in this county to clip the

sheep twice in the year, from a very mistaken idea that finer wool is thus procured. We need not enter into minutiae to show the contrary, as we have already alluded to the mode of growth and the characters of wool.

The ewes generally yearn in March and April, and, in order to prepare against this occurrence, they are brought down from the hills into the sheltered valleys, and here the lambs are fed during the first winter. With this exception, the flocks generally speaking pass all their time on the mountains, where they roam in almost uncontrolled freedom.

Passing from Merionethshire to Caernarvonshire, a land of mountains among, which Carnedd Llewelyn (3,471 feet), Carnedd Dafydd (3,429 feet), and Snowdon (3,557 feet) are conspicuous, we still find the mountains covered with sheep, many of which are horned. These sheep are small, averaging 9 or 10 lbs. per quarter; but in the lower grounds, and towards the Straits of Menai, they are somewhat larger, and average from 14 to 16 lbs. per quarter. These sheep, like those of Merionethshire, bear the impress of a semi-wild race, and throughout the whole year range the mountains, feeding upon the short pasturage. In some districts, however, they are driven to lower grounds during the winter, or are depastured on home sheep-walks, and many farmers hire winter pasture for the yearlings. Hardy must the flocks be which are exposed on the hills to the severities of the winter storms. Little or no provision is made for them, nor is any protection afforded them by smearing, either in this county or in other parts of Wales generally. Yet on the produce of these sheep do the hill farmers chiefly, if not wholly, depend. The wethers are sold at about four years old, and the wool is worth 10*d.* or 1*s.* per lb., the fleece averaging about 2 lbs.

Crossing the Straits of Menai into the Isle of Anglesey we find several breeds, some original, some crossed, and of course varying in size and qualities.

The old breed of Anglesey was generally hornless, black or dun faced, or mottled, long in the neck, high in the legs, long in the carcase, and narrow in the loin; the wool fine, and of medium length. This breed, now improved, averages from 16 lbs. to 18 lbs. per quarter, taking the wether at two or three years old. Besides this breed, which in some respects approximates to the Southdown, a white-faced variety is occasionally to be seen, but is most probably the result of some early cross.

The true Anglesey sheep holds out every prospect of improvement to the judicious farmer. Its wool equals that of the Southdowns, it has a remarkable aptitude to fatten, and is ripe at an early age, the fat being laid on inwardly, and rendering the sheep heavier than might be expected

from its external contour; the mutton is first-rate. The ewes are prolific, generally producing twins; they are good nurses, and after the lambs are weaned will continue for some time to afford milk for cheese-making. Here however as elsewhere in Wales the sheep are too much neglected, important as they are; and in this particular the contrast between mountain Wales and mountain Scotland is very decided. Anglesey however is a black cattle district, and raises a good quality of corn; sheep here being of secondary importance; nevertheless many intelligent farmers and proprietors have paid attention to the improvement of the sheep, not without considerable success. Among other sheep which were tried by way of a cross, the Merinos were made use of, and the cross breed produced a decidedly improved fleece; but what it gained in superiority of fleece was lost in hardness of constitution. Hence to a certain extent the experiment failed, though traces of the intermixture as evidenced by the character of the wool are not altogether obliterated. A cross between the Leicesters and the Angleseys was also effected with variable success; the Cotswolds were also tried, and a blended strain between Angleseys, Leicesters, and Cotswolds is kept up on many farms.

The hardy, active, black-faced sheep of the Peak of Derbyshire were also tried, but nothing was gained by the cross, for the wool of these sheep being inferior to that of the native race, no improvement in this respect was obtained, nor yet in qualities bearing more immediately on the interest of the feeder and butcher; the mixture was that of one hardy mountain breed with another. The Southdowns were also introduced by several agriculturists, but the mixed breed did not turn out altogether so advantageous as might have been expected, though the trial could not be called a positive failure. Some breeders tried the white faced Yorkshire sheep, and not unsuccessfully, either as regards the increased weight of the fleece or of the carcase, while at the same time the cross breed suffered little diminution in hardness. Among the most promising crosses that of the Cotswolds with the pure Angleseys may be said to be the most successful. The Cotswolds are, it is true, long-wooled sheep, but they are hardy, active, and enduring, lighter than the Leicesters, and content with poorer fare. While adding to the weight and length of the wool of the original Angleseys, they deprive not the cross breed of those qualities which fit it for its peculiar home; though perhaps it is less adapted for the rigid starving system once too prevalent not only in Anglesey but throughout the Principality in general. A better order of things however is now in the ascendancy; the railroads render the transit of Welsh mountain sheep, whether alive or in the carcase, to the metropolis so easy and expeditious

that it is the interest of the farmer to get his sheep ripe as early as possible for the market. Welsh mutton is no longer a rarity, though it commands a good price; every farmer soon discovers in what direction his interest lies, and when a field for competition is fairly open a spur is at once given to enterprise. This involves general improvements, the outlay of capital, an amended system of husbandry, attention to the breeds whether of sheep or of cattle; in short, to a reform in all the old practices which had little to recommend them, but to which prejudice clung with its wonted pertinacity.

Mr. Luccock calculated the number of sheep in North Wales to amount to 571,000, yielding 3,570 packs of short wool. Within late years an increasing quantity of long wool is grown, but to what amount it is not very easy to determine with precision. In the meantime a great change has taken place in the domestic economy of the Welsh peasantry as respects the manufacture of wool; once throughout the whole of the Principality home-grown wool was manufactured, at least as far as the spinning went, into materials for dress and furniture. Woollen was the common attire of both sexes; felt hats, coarse cloaks, strong flannels, and stuffs were in ordinary use, and yarn was prepared for knitted stockings. Now the wool is sent to the adjacent markets, and passes into the hands of various manufacturers; part is returned in various forms to the growers, and part is sent elsewhere. Welsh flannel still retains its deserved reputation, and in North Wales a considerable quantity is manufactured, as are also various kinds of coarse cloth, which finds a ready sale. Even since the year 1839 considerable changes have taken place. Mr. M'Culloch, speaking of the woollen manufactures of Wales (1839), observes that these are principally situated in the counties of Montgomery, Merioneth, and Denbigh. The product consists principally of webs, flannels, stockings, socks, wigs, and gloves. "The webs manufactured in North Wales are distinguished into two sorts; strong or high country cloth, and small or low country cloth. The first kind is made in Merioneth, principally on the domestic system, although in some parts there are factories. Almost every little farmer makes webs, and few cottages are without a loom. In some cases the manufacturing farmers supply wool of their own growth, but it is principally bought from the woolstaplers and skimmers. All kinds are used indiscriminately, and the qualities of the manufactured article are very various. There is a market for strong cloth at Shrewsbury, but it is customary for the drapers of that town to travel into the country and buy goods wherever they find them. It is usual also for the principal drapers to keep servants the greater part of the

year among the manufacturers who get acquainted with them, assist those who are poor to purchase wool, and superintend the making and dressing of the goods. A good deal of the strong cloth is exported, but a very considerable quantity is retained at home for workmen's jackets, ironing cloths, blankets, &c.

The small cloth is manufactured in Denbighshire, in that tract of country which includes Llangollen and Corwen. The factory system has not yet been applied to this article. The raw material is procured from the neighbourhood of Oswestry, and is sorted into two kinds, the finer part being manufactured into a sort of flannel, called Oswestry flannel, while the coarser is made into small cloth. Most of this is sent abroad. "Flannels form the most valuable and important article of the Welsh manufactures. They are principally made in Montgomeryshire, but not entirely so, for they are also made in various places, within a circle of about twenty miles round Welshpool. The manufacture used to be principally conducted on the domestic system, but there are now many manufactories in which it is carried on. In Shropshire too, into which the manufacture has spread itself, machinery is pretty generally employed. A market for flannels is held at Welshpool every alternate week. Formerly the manufacturers used to bring thither their goods, but now a set of middlemen go about the country and buy all the flannel they can lay their hands on. At this market nothing is sold on credit, every piece being paid for as soon as measured; and a similar system prevails at the other woollen markets throughout the Principality. Stockings, socks, wigs, and gloves are made principally in the town and neighbourhood of Bala."

Since 1839, the factory system has been gaining the ascendancy, and the manufacture of goods in the farmer's house, or in the cottages of the peasantry, has gradually declined. Nor is this change to be wondered at—a better and cheaper article can be thrown into the market from the manufactory than could be got up in the loom of the cottager; in short, as far as regards woollen manufactures, Wales is losing its original character, and identifying itself with the general routine of the factorial system, now dominant throughout the kingdom. In some places, no doubt, the wool is spun and woven at home, and a sort of patriarchal simplicity, not to say rudeness, still obtains; but even in these spots, coarse and simple articles are alone prepared—a home-made Welsh *whittle* (a kind of shawl) cannot, as we can testify, be now procured. But is this to be regretted? Certainly not. Let the husbandman pursue his duties, improve his lands, cultivate his sheep, bring heavier and more acceptable fleeces into the market, and gain his reward. What has he to do with carding, and spinning, and weaving? Before the

powers of steam were applied to machinery, before machinery itself was brought to perfection, before the progress of commercial enterprise, long retarded by a combination of circumstances, had overpassed the mountain ranges of the land of the Cymri, the necessity of coarse home-made materials for clothing is apparent; but time passes on, and all things change with time—fashions, customs, opinions, our modes of agriculture, the characters of our most important domestic animals, our manufactures, our roads, and our seaports, all suffer a change, may we not say into “something rich and strange,” certainly into something which our forefathers never anticipated, even in their most ardent speculations.

Passing from North Wales into the more northern counties of England, we find various breeds of heath sheep depasturing on the hilly tracts of country, not, however, unmixed with sheep of many other races and intermixtures. Of these Leicesters, Southdowns, Herefords, Cotswolds, and Cheviots may all be seen. Lancashire is a great manufacturing county, and sheep husbandry is not its forte, yet in some of the hilly parts, towards Yorkshire, an original horned breed termed the Woodland sheep is still to be found, and this stock extends even into Scotland; not that it is kept as a pure breed in all places, on the contrary, it is variably crossed and thereby much modified, according to the suitability of the pasturage and the views of the farmer. For this purpose, Southdowns on the one hand, and long-woolled Leicesters on the other, have been put into the field, to the increase, in both instances, in the weight of the carcase in the cross-strain, and in that of the latter to the augmentation of the weight and value of the wool.

On the borders of Lancashire, adjoining the county of Westmorland, a horned breed of sheep with white legs and faces is prevalent. This is known as the Silverdale breed, and is peculiar to tracts of rocky limestone. The wool is of moderate length and good quality, and the sheep ripens early and affords excellent mutton.

In Westmorland the mountains and barren wilds are tenanted by sheep similar to those of the hilly parts of Lancashire, but in the lower grounds and good pastures mixed races of long-woolled sheep prevail. The same remarks apply to Cumberland, on the mountains of which a rough-legged breed, with a thin meagre carcase and coarse hairy wool, is still common, although in some parts it is now improved, and especially by a cross with what is called the Herdwick breed. The Herdwick breed is said to be of Scotch extraction, and to have been introduced into Cumberland in a very singular manner. It would appear from Mr. Youatt's statement that early in the last century a ship was stranded on the coast of Cumberland, having on board some peculiar sheep, which, as is

asserted, came from Scotland, although none of like characters are to be found in that portion of our island at the present time. These sheep were got on shore, and were purchased by several farmers who lived at Wasdale-head in the neighbourhood of Keswick, who at once perceived their superiority to the native mountain sheep. They are small, well made, active, and polled, the faces and legs being more or less mottled with black. Their fleece is of moderate fineness, and very close set. When wandering uncontrolled over the mountains, they display remarkable instinctive sagacity, both in foreseeing the approach of snow-storms, and in choosing situations free from the danger of being overwhelmed. When the storm comes, they seek the most exposed part of the mountain, where the violence of the wind sweeps the snow onwards, without allowing it to lodge and accumulate, and there huddled together they keep stirring about so as to trample down the snow, and to await the subsidence of the tempest. Their matted close fleeces enable them to resist the severity of the cold; they require in winter little or no hay, but moving about from spot to spot, they scrape away the snow until they come to the herbage buried beneath it; no sheep in fact could be better fitted for the locality into which accident, according to the above account, had thrown them. The farmers soon regarded them with unwonted interest and satisfaction, and those who owned them formed themselves into a sort of club or society, with the express object of preventing the spread of these sheep as much as possible, and of keeping the stock exclusively in their own hands. They came to the resolution never to sell a ram, nor more than five ewe lambs in one season; but with all their care they failed in accomplishing their selfish, unpatriotic design. The breed spread, and more or less influenced the native stock, not only in many parts of Cumberland but of Westmorland also.

The Herdwick breed is noted for its hardiness, a better wool than that of the old race, and the superiority of the mutton. The wethers are in their prime at three or four years old, and are said to be in prime season from June to September, when the aromatic heath plants are in bloom, the flesh acquiring at this time the richest flavour. The weight of the carcase is from 10 lbs. to 12 lbs. per quarter.

The ewes are kept as long as they will breed, often till twelve or fifteen years of age. The lambing season is in May. In the rearing and management of the lambs the shepherd has little trouble. They are well defended by wool and are active and hardy.

Whence the term *Herdwick* was applied to this breed is not very clear. It is stated that the word has reference to the custom of farming out the flocks to herdsmen, who retained a certain number

of them in lieu of wages; and Mr. Culley says, "The mountains (of Hardknot, Scalefell, Wrynose, &c.) upon which these sheep are bred belong to Lord Muncaster, as do also the flocks that depasture upon them, which have from time immemorial been farmed out to *herds* at a yearly sum. From this circumstance these farms, three or four in number, have obtained the name of *Herdwicks*, that is, the district of the *Herds*, and the sheep the appellation of *Herdwick* sheep. They have gained such a character for hardiness of constitution that Mr. Tyson, who farms the principal flock, sells a number of rams every year (to improve the hardiness of other flocks) into various parts of the adjoining counties. The price is often as high as two guineas and a half."

It would appear from Mr. Culley's account that he considers these sheep not as imported but as indigenous in a certain district of Cumberland. It is, he says, "peculiar to that high, exposed, rocky, mountainous district at the head of the Duddon and Esk rivers, more particularly known by the names of Hardknot, Scalefell, and Wrynose."

Be this as it may, and we confess we know not on what authority the account of their arrival in a vessel stranded on the coast of Cumberland rests, this breed has much improved the ordinary hill race. The cross breeds, however, are mostly horned and generally mottled about the face and legs, sometimes black. They are active and hardy, high in the shoulders, and inclined to be narrow in the back and flat in the sides. The wool is coarse.

In the low and fertile lands many flocks of Leicesters are now established, and a considerable quantity of long wool is grown, but to what precise amount we have no data for ascertaining. Mr. Luccock estimated the number of packs of short wool at 5,915, averaging each fleece at $3\frac{1}{2}$ lbs.

In the low and more fertile parts of Cumberland flocks of Leicesters are to be seen, and mixed breeds of long-woolled sheep, to which great attention is paid.

In Northumberland great changes have of late years taken place in sheep husbandry. This county, indeed, stands pre-eminent for scientific farming, for an improved mode in the cultivation of turnips, and for the rearing and fattening of cattle. Turnips occupy a large portion of almost every farm. They are not sown broad-cast, but by drilling on narrow flat-topped ridges into which the fields are laid by means of the plough and a roller, having been previously well manured. By this system abundance of food is secured for sheep, of which the improved Leicesters are extensively cultivated, and in some places Southdowns, together with other breeds of excellence.

But besides these the mountain districts have their own races. In the west of Northumberland

the black-faced horned mountain race, which extends over Scotland, chiefly prevails; but the Cheviot hills, which, notwithstanding their elevation and their conical peaks, are covered, excepting in boggy parts, with a fine green turf, affording excellent pasturage for sheep, are the original nursery of a peculiar breed called the *Cheviot*, which in Scotland contests for superiority with the black-faced.

On the Cheviot range this breed has existed from time immemorial, but has lately been improved, principally by a system of crossing with the Leicesters, not so much as respects the wool but the weight and contour of the carcase.

The Cheviot breed are hornless, the faces and legs in general white. The best kinds have a fine open countenance, with lively prominent eyes. The body is long, the forequarter wanting in depth in the breast, and breadth both there and on the chine. The legs are fine, clear, and small boned; the pelt thin; weight of carcase when fat from 12 lbs. to 18 lbs. per quarter; fleece from $2\frac{1}{2}$ lbs. to $3\frac{1}{2}$ lbs. The wool is not all fine, there being only 2 lbs. of fine wool and 1 lb. of coarse wool in a fleece weighing 3 lbs.

Such is a summary of Mr. Culley's description of the Cheviots of his day, which he states were then in progress of improvement. These sheep still retain the name of long sheep, in contradistinction to the short-bodied black-faced breed. They are full behind the shoulder, and the forequarters are justly proportioned to the hind; they are straight in the back, round on the rib, clean and small boned in the limbs; the wool is fine, and comes forward behind the ears, but leaves the face uncovered; it is however inferior to what it was before the improvement of the carcase commenced, and is longer. It is useful for many combing purposes, but quite unfitted for the manufacture of fine cloth, to which it was once applied. It is only adapted, according to Mr. Varley (evidence before the House of Lords, 1828), to make "low coatings and flushings." The Cheviot sheep is capable of enduring much cold and privation; it possesses considerable fattening properties, the wethers being ripe for the butcher at two years of age, and averaging from 15 lbs. to 18 lbs. the quarter. They may however be fattened to a much greater weight, and some have been exhibited weighing 30 lbs. or 32 lbs. the quarter. The mutton is excellent. This description applies to the Cheviots with a cross of the Leicester. In all that regards size, form, and contour, they are superior to the old breed; but the wool has become coarser and longer. The fleece is not now short and close, as it was when Sir John Sinclair in 1792 described the old breed before it was changed by intermixture with the Leicesters, perhaps in too partial terms.



CHEVIOT.

That there is room for improvement in the wool of the Cheviots, cannot be doubted, and by careful selection of the breeding stock, it might doubtless be rendered finer in the pile—perhaps shorter, and at the same time closer and thicker than it usually is at present, so as to form a more impenetrable covering; and again, the proportion of coarse wool in the fleece, which Mr. Culley estimates at one-third, and which is not much if at all altered in the new breed, might be greatly reduced, so as to render the fleece more equal universally in point of fineness and felting properties. At the same time the wool of the Cheviots is far superior to that of the black faced breed, and is worth more in value (especially when white or unsmeared), by upwards of fifty per cent. On the other hand it cannot be compared with that of the Southdowns. We must not however forget that considerable improvement has already been effected, and in process of time the Cheviots will utterly supersede the black-faced in the northern mountain ranges. We cannot here avoid quoting a passage from Mr. Culley, which is worthy of that enterprising and skilful breeder, whose judgment of the live stock of his time was almost unequalled. “As knowledge,” he says, “is progressive, we cannot expect the perfection of this breed of sheep can be obtained at once; it must proceed by slow gradations, as every other improvement has done. It is a great point gained that we admit defects, and are desirous to amend them.

“That breed of sheep which brings the most

profit to the farmer will always be pursued by him, whatever his situation; but that object is not to be obtained in this district (the Cheviot district and the like) *from fine wool alone*. Perfect mountain sheep should be *hardy, well formed, and quick feeders*. These qualities will always recommend them to the grazier, who will never purchase a slow feeding animal while he can get one of a different sort, though at a considerably advanced price. But if to these qualities, so essential to the sale of a mountain farmer's stock, can be added a *fleece of fine wool*, a breed of sheep would then be obtained the properest for a hilly district of any we have yet seen.* There is little doubt but this may be accomplished by *proper selection*, and probably the *best* kind of Cheviot sheep, from their hardiness and producing a portion of fine wool, are the properest stock for laying the foundation of so desirable an improvement.”

In shape and quick feeding, the Cheviots *have been improved*; this cannot be denied; and now by *proper selection* the fleece is in progress of improvement.

With respect to the black-faced or short sheep, as they are termed in contradistinction to the Cheviots, a few observations may be here made, in order to point out their chief characters. These

* It is not the value per *pound*, which constitutes the farmer's profit, but the value per *fleece*; or rather that breed is the best that brings the most profit *in fleece and carcase jointly* from the same ground in equal times. On the side of the fleece, and on that of the carcase, there must be a sort of *give and take* accommodation, and the farmer will soon find to which side to lean, in order to his own remuneration.

sheep are active, vigorous, and hardy; the males have large heavy spiral horns, and the countenance has a wild and bold expression. The wool is open, coarse, shaggy, and rather long; it covers the forehead between the roots of the horns and the sides and base of the lower jaw. The face and limbs are black.

By care and skill in breeding this sheep is much improved to what it was. The general form is good, the carcase is short, round, and firm, the limbs of moderate bone, firm set, and clear; the system is capable of enduring the severities of a northern winter on the mountains; and the mutton is celebrated for its excellence. Indeed these sheep have, since the establishment of steam vessels and railroads, been sent from the north in considerable numbers to the London markets, where they sell well, the fineness of the grain of the meat and the delicacy of its flavour being duly appreciated. Although, as we have said, this breed is common on the mountains of Westmorland, Cumberland, and many parts of Northumberland, Scotland appears to be its stronghold, where it contests for predominance with the Cheviots. To both these breeds of sheep, to their comparative merits, and fitness for the mountains of that portion of our island, we shall have again to revert when we turn our attention to the Scottish sheep, so important to the mountain farmer.

Mr. Culley describes a dun-faced breed of hornless sheep which formerly tenanted the mountains of northern England and the adjacent parts of Scotland. No distinct trace of this breed can now be discovered. It was of very small size, weighing no more than 6 lbs. or 7 lbs. per quarter, but the mutton was of first-rate quality. The face, in general, was of a dun or tawny colour; the wool was very fine, and variously mixed and streaked—black, brown, red, and dun. It is perhaps to this breed that Anderson alludes when he notices a fine-woolled breed that existed three or four centuries ago in many parts of Scotland, and particularly in Annandale, Niddesdale, and Galloway. It lingered till lately in the neighbourhood of Aberdeen, and also in some parts of Fifeshire; but is now lost. Mr. Culley has some peculiar ideas respecting this lost breed, which are not altogether unworthy of consideration. He observes, that it is probably descended from, or crossed by, sheep that might have been introduced when the Spanish Armada suffered upon our northern coasts; and, in corroboration of this view, he adds, "a breed of this kind is found in Spain, as appears by the information I lately received from Matthew Stephenson, Esq. of Breaks Hall, in Westmorland (a gentleman whose attentive observations when abroad do him the greatest honour), which seems to put this matter almost out of dispute.

He says, 'When in Spain, I saw in Andalusia exactly the same kind of sheep you describe under the title of the dun-faced sheep, and which the Spaniards call *Ovejas Marinas*, of whose wool, as I was told, the fine Segovian cloths were made. This wool is reckoned the finest in the world, excepting, perhaps, the Vigonian wool of Peru, and the Cassimerian wool, of which the finest turbans are made.'

After this Mr. Culley says, "I am inclined to think them too tender and delicate a breed for the mountains, and shall not wonder if they are in a few years driven out by that hardy race of mountaineers described as the heath sheep; or more probably by the Cheviot sheep, from the exertions now making by the British Wool Society to introduce them into those districts, on account of the superior quality of the wool."

If the account of these dun-faced sheep be correct, neither the black-faced sheep nor the Cheviots at all approached them in the quality of the wool, but greatly exceeded them in hardiness—a point of great importance in a mountain country; hence, the dun-faced breed gradually faded away, and left their name alone on record. Such sheep may still exist in Andalusia, but we are not aware that any traveller has noticed them. But, granting their existence, this is not to be wondered at; for the interior of Spain is less familiarly known to us than Southern Africa or Hindustan.

Descending from Northumberland into Durham, we find the moorlands occupied by the black-faced sheep, but in all the lower and cultivated parts of the county long-woolled sheep have become established. Among these the Leicesters are prevalent, insomuch that good long wool may be regarded, as far as sheep are concerned, the staple growth of Durham. Formerly a very large breed, which bore a heavy fleece, occupied the south-eastern parts of this county. The wethers often weighed from 50 to 60 lbs. the quarter; but they were late in ripening, and are now superseded by the more profitable Leicesters of the improved race, or have merged into the latter by repeated crossings.

In the adjacent county of Yorkshire the old Teeswater and long-woolled breed (but now intermixed with the Leicesters) long predominated along the banks of the Tees and the Humber, in the North and East Riding, and, greatly improved, have now established themselves in every part of the county. Nevertheless, on the hilly grounds and moorlands, different breeds of short-woolled sheep will ever maintain their ground. The wild bleak moorlands of the North Riding are tenanted exclusively by a short-woolled race, which depasture all the year round on the dreary open heaths, contented with the coarsest fare. These

moorlands are intersected by sheltered valleys, which for the most part are well cultivated and fertile; but except perhaps in the depth of winter, the flocks are not driven there for shelter. The original breed on these moorlands is of small size, with coarse hairy wool, black or mottled legs and faces, wide-spread curling horns, and fine-boned limbs. The wethers averaged from 10 to 14 lbs. per quarter; the ewes much less. This small, hardy, active breed is now much improved owing to judicious crossings; still it retains much of its original character. It appears to be closely allied to the horned black-faced Norfolk breed of the olden time, and is, we suspect, a mere variety of the northern black-faced race to which we have previously alluded. This latter race is also to be found in many parts of the Yorkshire moorlands. Southdowns have in some places established themselves, or formed a mixed breed; and in other places flocks of Cheviots are to be seen. In the hilly parts of the East Riding a coarse-woolled small sheep, with black face and limbs, but destitute of horns, still lingers.

In the West Riding a peculiar breed of sheep called the Penistone (from a town of that name between Sheffield and Huddersfield), has existed from remote times, and a similar breed is found in Craven. This breed is horned, and has spotted legs and face. The wool is of moderate quality, and the wethers average 15 or 16 lbs. the quarter. In the north this breed has been crossed with the mountain black-faced race, but without any advantage. In the more southern parts, the Leicesters, the Cheviots, and the Ryelands have been resorted to, and with decided success, particularly in the case of the last two breeds.

The usual yeaning time in the moorlands does not occur till the month of May, when the snows have melted away and the weather is open. The consequence is that the farmer loses very few lambs comparatively, and may congratulate himself on his prudent management.

Looking at the extensive county of Yorkshire as a whole, we cannot shut our eyes to the fact that wherever the pasturage will bear them the long-woolled breeds of sheep are making rapid progress. In the year 1800, for example, the packs of short wool amounted to 19,000, those of long wool to 3,200. In 1828 the packs of short wool, according to Mr. Hubbard's calculation, amounted only to 5,708, while those of long wool had increased to 17,224. Such are the changes which have taken place in the predominance of certain breeds of sheep, and in the modification of all.

We may in a great measure apply the same observations to the sheep of Derbyshire which we have done to those of Yorkshire. Formerly a short-woolled sheep was prevalent generally, but now in all the fertile parts long-woolled breeds

have become established. In the high moorlands of the Peak however a wild black-faced small mountain breed still maintains its ground. These sheep have large curling horns and wool of moderate quality but belonging to the short kind, often close, soft, and excellent for felting, sometimes even fine. In less rude and exposed situations a polled sheep with a coarse and hairy fleece was to be seen, but this breed has been greatly improved by intermixture with the Leicesters, and is now really valuable. The sheep has not lost its activity, but its wool is decidedly ameliorated, and it has acquired a greater weight of carcase. The mutton is of first-rate quality, especially when fed on the gritstone districts. The ewes yearn early, and the lambs are excellent.

In the lowland and more fertile parts of Derbyshire the long-woolled sheep have been rapidly on the increase, and are now predominant.

Nottinghamshire was once noted for small breeds of short-woolled sheep; of these one was horned, with black legs and face, and having a fleece of fine short clothing wool; this breed was chiefly peculiar to the sand district west of the Trent. In the forest of Sherwood a distinct breed existed; it was polled, with the face and legs gray, and it yielded a small fleece scarcely exceeding a pound in weight of very fine clothing wool. Of these breeds few traces are now to be found. In some districts flocks of Southdowns are to be seen, but long wool is now the chief produce of this county.

In Lincolnshire generally the improved Leicester breed prevails; although in the northern and western districts many flocks of pure Southdowns are kept. Formerly a coarse-woolled sheep was common, having the staple of the fleece of moderate length, but it has merged into the Leicester breed, or altogether passed away.

In the counties of Norfolk and Suffolk, a peculiar variety of heath sheep has existed from remote times, although it is now seldom if ever to be seen in its purity. This breed was horned; the horns of the males were large and spirally twisted, those of the ewes and wethers small; the legs and face were black, the latter was long, with a flat chaffron, the aspect was wild and animated; the fleece was of inconsiderable weight, but consisted of fine short wool. With respect to contour the shoulders were low, the fore-quarters deficient compared with the hind-quarters, and the loin was inclined to be narrow. These sheep fattened early and produced excellent mutton, and thrived on coarse and scanty pasturage. They were very hardy, and bore the fatigue of daily travel to and from a distant fold without inconvenience; from these circumstances, and from its utility as a folding sheep on sterile land (thereby converting it into good arable land), the old Norfolk sheep was a



OLD NORFOLK RAM.

great favourite with the farmers, by whom it was much improved. The butcher also found this sheep profitable; in proportion to its weight it carried much loose fat, and it is asserted more kidney fat than any other breed whatever. Long did this really valuable breed maintain itself against all rivals, but it was ultimately destined to succumb before the still more valuable Southdowns. On the first introduction of these latter, crosses between them and the Norfolks were tried but without any decided advantage, and gradually the star of the Southdowns rose in the ascendancy.

It is true that the Norfolks were as good folding sheep as the Southdowns, would bear journeys as well or better, and would thrive in coarse pastures where the Southdowns would refuse to feed. But on the other hand, the Southdowns were found to be far more tractable and contented than the restless Norfolks, they endured without suffering, any inclemency of the weather, they consumed a smaller quantity of food in proportion to their size, and gained from that food a far superior weight, nor did they wander about destroying by the trampling of their feet as much food as they ate, but settled quietly down in their pasturage as if well satisfied and happy. Besides, they yielded a far greater weight of fleece, more readily disposable in the market, and that too at a higher price. The ewes yeanned more lambs taking the flock together, and were better and more attentive nurses. In 1803 the Earl of Albemarle presided at the Thetford wool fair, and detailed the comparative merits of the two rival breeds. He stated that as far as his experience had gone

the Southdowns were superior to the Norfolks, and assigned the following reasons for his opinion:—He found them to produce more lambs, to be better nurses, to possess a much greater degree of hardiness, to yield more wool, and that more valuable. He kept by way of trial two flocks consisting one of 900 Norfolk, the other of 900 Southdown ewes, each flock having the same number of acres of nearly equal quality assigned to them. During the last year the 900 Norfolk ewes produced 752 lambs, the 900 Southdowns reared 826 lambs. During the time of lambing there were always from 15 to 25 Norfolk ewes penned up in order to induce them to own and take to their lambs, while of the Southdowns not a single ewe during the whole season was put into the pens or deserted her lamb. Of the 900 Norfolks 18 died in lambing, of the 900 Southdowns only 4. Of the Norfolks $15\frac{1}{2}$ fleeces went to the tod of 28 lbs.; on an average of the 900 Southdowns 11 fleeces made up the tod, and he obtained 2s. per tod more for the Southdown wool than he did for that of the Norfolk. He concluded by leaving it to those present to make their own inferences, but assured them that it was his intention to increase his flock of Southdowns. In 1809, at the Norfolk Agricultural Society, Mr. Coke said that although the prejudice of many farmers had made them slow converts from the favourable opinion they entertained of the Norfolk sheep, he would challenge any man to point out to him a flock-master who, having changed his Norfolk flocks for the Southdowns, had ever reverted from the Southdowns to the Norfolks again.

Thus the Southdowns became dominant. In the meantime various crosses took place between the Norfolks and other breeds, and even the pure Norfolks began rapidly to improve both in aptitude to fatten, in weight of carcase, and that also of the fleece. In fact agriculture had begun, in every department, to make great progress in Norfolk, and is now carried to a high state of perfection; there is, consequently, better and more abundant food for sheep, which, independent of their value in other respects, benefit the land by their manure. It is generally the practice, after the summer and autumnal pastures and seed and meadow grass mowings are consumed, to feed both breeding and fattening sheep, and also young store sheep and lambs, upon turnips, meadow and seed hay, and winter tares. The Norfolk farmers and graziers are more partial to turnips (Swedes and others) than to any other sort of green winter food. About an acre is generally allowed for every ten fattening wethers or twelve breeding ewes; and when these do not perfectly consume their allowance, they are followed by the tegs, or previous year's lambs. These soon clear up all that was left, and contribute to the improvement of the soil. Owing to the improved system of agriculture, more sheep are kept on the cultivated lands than formerly, and each sheep is heavier both in fleece and carcase. Numbers are also fed on the marsh lands, and also on tracts which thirty or forty years ago would scarcely afford food.

We must not suppose that there are no long-woolled sheep in Norfolk—quite the contrary; and of late years their number has been on the increase, insomuch that the packs of long wool a few years since were estimated by Mr. Hubbard at 8,550, while those of the short wool at only 4,300. This statement differs from that of Mr. Luccock, who calculates the packs of short wool at 5,700, and of long wool at 1,120. The probability is that the quantity of long wool is on the increase, while that of the short wool remains stationary; for within the last twenty-five years the whole quantity of wool produced in Norfolk has doubled. We need not say that none is available for fine broad-cloths; but it is made up into flannels, and also, when mixed with foreign wool, into low or inferior cloths. The Norfolk wool finds its chief markets in Yorkshire and Lancashire.

With respect to Suffolk, although there are now more long-woolled sheep, Leicesters, and cross-breeds, than formerly, still the principal flocks are Southdowns, which yield upwards of 8,800 packs of wool. It is a great object with the Suffolk farmer to rear early lambs for the butcher, and for this purpose he finds the Southdowns, or a breed between the Southdowns and Norfolk, most advantageous. As soon as these are fattened they are sold off at Ipswich fair, the farmer pur-

chasing fresh breeding stock. It is calculated that about 100,000 sheep and lambs are every year exposed there for sale.

Passing from Suffolk to Essex (two counties which, with Norfolk, constitute the best and most skilfully cultivated tract in the southern part of our island), we find various breeds of sheep kept chiefly for the supply of the London markets; Southdowns and cross-bred Norfolks are the favourites. Essex yields about 8,650 packs of short wool. Formerly a small breed of sheep was to be found on the commons of this county, while in other parts a sheep yielding a long coarse fleece averaging about 4 lbs. in weight was general. But these breeds are not now to be seen.

With respect to Leicestershire, Rutlandshire, Warwickshire, Northamptonshire, Cambridgeshire, Bedfordshire, Hertfordshire, and Middlesex, little need here be said. Middlesex is not a true breeding county; but the sheep it contains are mostly of the short-woolled stock. Hertfordshire is a halting and grazing district for flocks destined for the London market, and these are of all kinds. In many parts, however, and especially about Rickmansworth, house lambs are reared for the metropolis.

From Leicestershire the long-woolled race has radiated, spreading over the midland and south midland counties generally, superseding almost every other breed excepting the Southdowns, and in Cambridgeshire crosses, between the Norfolks and Southdowns, or between the latter and the Leicesters. In Bedfordshire the Southdowns are established on the southern tract of chalky hills, but elsewhere the Leicesters predominate. In Buckinghamshire the sheep on the Chiltern hills are of the short-woolled strain—Dorsets, Wiltshires, and Southdowns; but in other parts the Leicesters and Gloucesters have gained ground, and long wool of excellent quality is grown on the banks of the Ouse and the Vale of Aylesbury. Buckinghamshire is one of the counties in which lambs and sheep are fattened for the London markets; many ewes are kept for the sake of early lambs, the Dorsets being preferred for this purpose, and the Southdowns for mutton. On the Chiltern hills it is the usual practice to buy two-thirds of wethers and one-third of ewes in autumn; the wethers are fattened on turnips, and the ewes, after their lambs are sold off, are themselves fattened on grass the next summer.

In Huntingdonshire few sheep except the Leicesters are to be seen, and long wool may be said to be grown exclusively.

We shall not expatiate on the changes and crosses to which the breeds of sheep are subject in the counties just enumerated; and with respect to the long-woolled races we shall hereafter proceed to notice them more particularly. But before



BLACK-FACED SCOTCH SHEEP.

quitting this part of our subject, we must revert to Scotland, which, in our cursory survey of the Cheviots and the black-faced mountain sheep, we stated to possess both these breeds as rivals for predominance. We need not recapitulate their respective characters, both breeds are adapted for a mountain home.

Lanarkshire is the great nursery, so far as Scotland is concerned, of the black-faced horned sheep, and they extend their range throughout the Grampians and their offsets, from their most southern to their most northern limits. In Lanarkshire the standing stock of these sheep has been estimated at upwards of 120,000, of which a great proportion are breeding ewes, the wether lambs being sold to the farmers of the mountain districts. The ewes generally produce the first lamb when at the age of two years; some, however, at an earlier age, before the constitution is sufficiently matured.

In most places these sheep have little protection against the severity of the winter season; but as Lanarkshire is a breeding county, some degree of care is taken of the flocks, as extensive losses would be a serious evil. Circular open stalls or pounds, consisting of a wall five or six feet high, are built on the moorlands and pastures, to serve as a partial protection against the driving tempest, and in some places this stall is surrounded by fir trees. To these stalls the sheep retreat for shelter in cases of emergency, but are never fastened up. They wander forth at will searching for food, and it is only when the snow covers the grass too deeply for them to get at it that they are supplied with hay or other provisions. In some parts the sheep

are pastured in the lower districts during the depth of winter; but this plan entails additional expense, inasmuch as the farmer has to pay for their pasturage at the rate of about 1s. 6d. per head, and this, beyond the ordinary expenses of shepherds, of materials for smearing, and the payment of rent, effects a great reduction on the farmer's profit, more especially when the losses by disease, accidents, and the severity of the weather are taken into the account.

The mountain sheep farmer's profits, as must be evident, are precarious. He depends greatly on his clip of wool. This may fall short (from losses); and besides, the demand for coarse wools is liable to fluctuation.

The improvement of the black-faced sheep has not arisen from any crosses, for none of these have fairly succeeded, but from careful and judicious selection. The best wethers when fattened average about 16 lbs. per quarter, but when forced beyond a natural size, as is sometimes done for the sake of show at some of the agricultural meetings, the flesh loses its fineness of grain and its peculiar delicacy of flavour. In all sheep this is the case. Mutton grossly overloaded with fat is neither wholesome nor of good quality; and this deterioration is the more perceptible in breeds of noted excellence for the goodness of their flesh. There is a proper point in fattening sheep, not only as it respects profit but the quality of the meat, at which to stop. Let it not, however, be supposed that we recommend lean ill-fed mutton, for such is not our meaning.

As numbers of sheep are kept on the pasture

lands and mountains of Scotland, requiring daily care and watching, and that too in a wild bleak country, the office of a shepherd becomes one of importance, and the value of a good and experienced shepherd is always acknowledged. The plan on which these men are engaged is admirable, and binds them to their masters' interests, or rather makes their mutual interests the same. For example, if the shepherd be a married man he is allowed a cottage, generally consisting of two apartments, with a little garden or kail-yard and a potato patch. He has also grazing ground for one or even two cows, and the liberty of pasturing on his master's land from ten to fifty sheep, sometimes more, during summer and winter, with their lambs to a certain time. In addition to these privileges he has a certain allowance of oats, barley, and peas for the sustenance of himself and family. In this lone hut upon the mountain's side dwells the shepherd, his family, and his dog. During the summer all is pleasant. True, his life is monotonous, but the Scottish shepherd, peasant though he be, is not uneducated, and his own mind affords him resources against *ennui*. Men celebrated in the paths of literature have been for years the tenants of such a cottage, and keepers of another's sheep. But winter comes on with its storms and tempests, and then the utmost activity, vigilance, and experience of the shepherd are called into full exercise. He is ever anxious, ever on the watch for changes of weather, and his family, nay his faithful dog, participate in his solicitude. "I know of no scene," says the shepherd-poet of Ettrick, "so impressive as that of a shepherd's family sequestered in a lone glen during the time of a winter storm. There they are, left to the protection of heaven alone, and they know and feel it. Before retiring to rest the shepherd uniformly goes out to examine the state of the weather, and make his report to the little dependant group within. Nothing is to be seen but the conflict of the elements, nor heard but the raving of the storm. Then they all kneel around him while he recommends them to the protection of Heaven; and though their little hymn of praise can scarcely be heard even by themselves, and mixes with the roar of the tempest, they never fail to rise from their devotions with their spirits cheered and their confidence renewed. Often have I been a sharer in such scenes, and never in my youngest years without having my heart deeply impressed. We lived as it were inmates of the cloud and the storm, but we stood in relationship to Him who directed and governed them."

With respect to unmarried men, they generally live in the farmer's house, and besides their maintenance have wages of ten, twelve, or even sixteen pounds per annum, besides pasturage for a certain number of sheep. Thus each shepherd

has not only his master's sheep but his own, and perhaps those of his fellow-servants, or of some cottager, to attend to, and hence he feels a personal interest in the safety of the whole. On extensive sheep farms it is necessary to employ several shepherds, according to the number of the sheep. Each man has usually twenty or thirty scores and sometimes even forty scores of sheep under his care. The qualifications of such a man for his arduous duties are well described in *Little's Practical Observations on Mountain Sheep*. "He should be honest, active, careful, and above all calm-tempered. A shepherd who at any time gets into a passion with his sheep, not only occasionally injures them, but acts at great disadvantage, both in herding them and working among them. A good-tempered man with a close-mouthed dog will effect the desired object in half the time and with half the trouble that it gives to the hasty passionate men. The qualification of a shepherd is not to train his dog to running and bounding, but to direct the sheep according to the nature of the soil and the climate, and the situation of the farm, in such a manner as to obtain the greatest quantity of safe and nutritious food at all seasons of the year. It is not by walking much, or seeming to be doing much, that a shepherd proves himself to be a good one, but by walking so as to disturb the sheep the least, and by doing, and at the time, whatever is necessary to be done. There is not an experienced shepherd who does not, as soon as he rises in the morning and observes the state of the weather, know where to find every sheep on the hill, and he will accordingly take his course to the place where he knows his presence is much wanted. If any of his own or his neighbour's sheep have trespassed, it is foolish to dog or abuse them; but the more quietly they can be turned back the better. If the boundary should be on the top or ridge of a height, to which sheep are apt to draw at night, it is better to turn his own a little closer to the boundary in the afternoon than to drive back his neighbour's; it will answer the same purpose; and after the flocks have been a few times gently divided in the morning, without dogs, they will become so well acquainted with their own side, that at the very sight of the shepherd they will take to it without trouble.

"Those shepherds who dog and force their flocks I take to be bad herdsmen for their masters, and bad herdsmen for the neighbouring farmers. If the boundary be a burn, or brook, or low ground, where the sheep graze in the middle of the day, the same plan should be adopted, by turning the sheep down tolerably early in the day."

Forethought, command of temper, and watchfulness are the great qualifications of a mountain shepherd, to which must be added experience and

habits of observation. We have said a mountain shepherd, but indeed they ought to be the qualifications of every shepherd, whatever be the nature of the locality in which his flock is depastured.

The mountain sheep-feeders generally purchase their stock designed for grazing from the breeders while yet lambs, or not more than one year old; these are fed on the hills till the age of three years, when they are sold to the low-country farmers, in order to be fattened on turnips, and then sent in the course of the ensuing spring to a near or distant market. Numbers are now sent to Smithfield. It is only in suitable districts, and as we have said especially in Lanarkshire, that breeding stocks can be profitably kept; they require more unremitting attention and due shelter from the cold and storms in winter.

The price of lambs from the breeder varies, as may be naturally expected; it usually ranges between 7s. and 12s. One year-old-lambs or hoggets average from 14s. to 16s. or 18s., and at three years old they are worth from 20s. to 28s., or even more, according to the state of the markets. Taking losses and expenses together, the feeder's gains, as far as the carcase is concerned, are but low; hence, as we have said, he must look to his wool, the quantity of which is precarious, and the demand for which is fluctuating. Here we may ask, are the Cheviot sheep more profitable? To these sheep, by way of comparison with the black-faced, let us now attend. As we have already said, these sheep are originally from the Cheviot hills, whence they have extended far and wide into Scotland, usurping the place of the black-faced, or sharing the mountains between them.

First, as regards wool, though that of the Cheviot sheep is longer and coarser than it was before the late improvement of the carcase was effected, still it is very far superior to that of the other breed, and might be rendered more so by proper attention. Indeed its amelioration has already commenced. We have said how important the wool is to the feeder, in order to enable him to meet his expenditure and various contingencies. So far the Cheviots are the more advantageous of the two.

Secondly, with respect to feeding. Here the Cheviot has immeasurably the advantage. The Cheviot is quiet, contented, and patient of hunger. It has nothing of the wild restlessness of the black-faced, consequently it thrives better on the same fare than does the latter, and comes to maturity a full twelvemonth earlier. When the fattening process commences the Cheviot gains rapidly upon its rival, though a twelvemonth older, and leaves it far behind. Not only does the Cheviot fatten far earlier and quicker than the black-faced, but is superior in size and weight. It must however be confessed that so many of the

Cheviots cannot be kept on the extent of pasture land as of their smaller rivals, but they will produce a greater weight of mutton and of wool, and become fat and ready for the butcher twelve months sooner, leaving the land free for their successors. In these points then they are superior to the black-faced; and if we take into consideration the great improvements which have within the last few years taken place in Scotland, the cultivation of turnips and artificial grasses, and the superior system of sheep management, we think that now more Cheviots may be fed on the same extent of land than black-faced could have been in times past. Certain it is that sheep farms are more numerous than they used to be, their value has augmented, and the number of sheep increased to an amazing degree, and these too mostly Cheviots. In the forest of Ettrick, in the whole of Selkirkshire, and even in Sutherland, the Cheviots have superseded the black-faced. In many parts of the Grampians they have gained ground, but in the bleakest and wildest of the pastures of that extensive mountain range no sheep excepting the black-faced can exist; nevertheless the tracts unfitted for them are limited, and as agriculture makes progress their advance will be in an according ratio, for it is only to the black-faced that they yield in hardiness, and this is denied by many, inasmuch as their fleece is better calculated for a protection against cold than the more open and coarser fleece of the other. In the most northerly districts the wethers are found capable of withstanding the winter, but it is in the southern parts of Scotland that the breeding flocks are maintained. Here the ewes and other lambs find good shelter and a plentiful supply of food; and provided the yearning time is regulated so as to fall in after the inclemency of the season has passed, few losses will occur either among the lambs or their mothers; the latter moreover being themselves in circumstances of comfort, will take more kindly to their offspring, and prove assiduous and good nurses. It is better for the lambing time to be rather late than one week too early. It may extend from the middle to the close of April, and the weaning time will then be between the middle of July and the latter part of August.

We have alluded to the successful cross between the Cheviots and the Leicesters, and the failure of the cross between the former and the Southdowns. This latter cross is deficient in hardiness, and has proved utterly incapable of resisting the severity of a mountain winter; yet, singular to say, pure Southdowns, though the north is by no means congenial to them, have become naturalized in certain localities. Mr. Youatt states (1837), "that on the Sidlaw part of the Grampians, at Keillor, Mr. Hugh Watson has a flock of a thousand pure Southdowns, which he

has carefully preserved for the last twenty years, and which are now not only reconciled to the climate, but as healthy as any stock in the kingdom." This fact is sufficient to prove that with proper care, and in favourable localities, the valuable Southdowns may be brought to constitute an important portion of the stock of sheep in this part of our island.

Among the great improvements in the Scottish mountains bearing upon the preservation, comfort, and food of the sheep, may be noticed the introduction of enclosures, or of covered *stells*, supplied with food, for shelter during storms, and the drainage of wet boggy lands, thereby improving the quality and quantity of the grass, while at the same time a drier bed is afforded for the flocks, to the diminution of the ravages of the rot, and the preservation of health and comfort. The practice of burning the moss and heath on the hills is an excellent plan. After the burning fresh and better food springs up, and the sheep luxuriate in the renovated pasturage. To this we may add the practice of top-dressing, and also of mowing down coarse herbage in the spring, viz., heath, ling, bents, ferns, &c., and drying and stacking it for winter fodder when the snow lies deep, or when some addition to the supply of food afforded by the pasturage is needful. Another improvement consists in the erection of wide, simple, rude bridges over brooks and rivulets liable to be swollen into torrents during the winter, so as to maintain a communication between the two banks, of which the flocks may avail themselves as circumstances may render necessary.

With respect to the islands of Scotland little need be said. In Arran, Islay, and Jura, the black-faced sheep principally prevail; in the former island a small breed with dun faces and legs long maintained its ground, and indeed still exists, and is celebrated for the excellence of the mutton.

The native breed in the Hebrides is of small size and horned. The general colour is white; many altogether black or brown are to be seen. Within the last few years the black-faced breed has been introduced, and may be said to thrive well. In the Hebrides almost all the articles of clothing composed of wool are manufactured in the peasant's cottage. As may be supposed, these home-made fabrics are rude and coarse; but at the same time they are warm and durable, and well suited to the climate.

Numbers of sheep are kept in the Orkney Islands, where they wander during the greater part of the year in a state of liberty, and may be said to be almost utterly neglected. Nevertheless they produce a fine wool, but their flesh, in consequence of their habit of feeding on sea-weeds during the ebb of the tide, is said by Mr. Low (*Fauna Orca-*

densis) to be in general very indifferent. According to the same authority the flocks are *rowed* and not shorn. This operation takes place at Midsummer, when the wool is naturally loose; on a given day, the men of the parish assemble with their dogs, and by dint of exertion drive the flock into pens or enclosures, from which they are removed, each in its turn, in order to undergo the operation of having the wool plucked from the skin; after which the animals are turned loose to shift for themselves until the next *rowing* season. Should severe weather come on at this juncture many perish.

It has indeed been asserted that this operation gives no pain, inasmuch as the wool is at that time beginning to separate from the skin, and if not thus obtained would become disengaged and lost, and that consequently the cruelty is only in appearance. We doubt whether the men pay much attention to the precise time in which the *rowing* could be effected without giving pain; and Mr. Low expressly says that it "brings the whole blood to the skin," leading us to conclude that it produces considerable suffering.

Considerably north of the Orkneys are situated the dreary Shetland Isles, with their towering cliffs and bold headlands frowning over a dark and stormy sea. Formerly these islands were tenanted by the descendants of Norwegian and Danish colonizers, and formed part of the territory of the monarch of Norway and Denmark; and it is supposed, and with good reason, that the sheep, long celebrated for the fineness of their wool, were originally of Danish extraction, and imported by the early settlers. These sheep are very small, generally without horns, wild, active, watchful, and hardy. The carcase seldom weighs more than 8 or 9 lbs. per quarter. The wool, which is exquisitely fine, is sometimes of a lustrous white; but in other sheep, regarded by some as a cross breed or a distinct breed, it is dun, brown, or black, and of a cottony texture.

Although the pure Shetland breed has been crossed by others of larger size, to the deterioration of the wool and the marked diminution of hardiness, still in the more exposed and desolate parts the original breed remains in its purity, and leads a life of uncontrolled freedom. On the small uninhabited islands, or *holmes*, as they are called, these sheep find a congenial abode, and multiply unprotected by man, enduring the blasts of a northern winter.

Mr. Johnson, in his *Survey of the Shetland Isles*, thus particularizes the characters of a ram of the genuine Shetland breed. His skin, when the hair is parted, his palate, and the bridge of his nose, his horns, and his hoofs, should be white. His horns, if he have any—but the hornless breed is the best—should be set wide at the roots. The



SHETLAND SHEEP.

body should be long, the legs short, the hoofs broad, the head narrow, and the countenance pleasant. The wool should be fine on almost every part of the sheep, and weighing from $1\frac{1}{2}$ to 2 lbs., and worth on the average from 3s. to 4s. per pound.

“By the cross with the Dutch, which used to be the prevailing one, the carcase is heavier, the wool coarser often even on the neck and shoulders, and the fleece weighs four pounds or more (query), but is not worth one-fourth so much per pound. The tail is about six inches long, and shaped like a flounder, whence arose their name—the flounder-tailed sheep.”

In both breeds the wool is mixed with hairs, coarser in the cross breed than in the genuine; indeed in the latter the hair on some parts resembles that of some delicate fur.

Both breeds are managed alike, and that management is altogether bad. Once a year only is any particular notice taken of the flocks, and that is at the *rowing* time, when by the exertions of men and dogs the flocks are hunted home in order to be stripped of their fleece. No selection of rams and ewes for the purpose of breeding is made; nay, as the rams are apt to wander and escape pursuit, should a ram lamb yield a finer or heavier fleece than ordinary, instead of being preserved in order to improve the stock, he is castrated so as to reduce him to tameness, and make sure of his fleece annually for some years at least.

The rowing season generally takes place in April, when the wool has begun to separate from

the skin and rise above the long hairs. By dint of no little toil the semi-wild flocks, consisting of lambs, ewes, wethers, and rams, are driven into folds of different kinds, called *punds* and *crues*, and when all are secured the wool is pulled away, leaving the hairs, or at least the greater quantity of them, still adherent to the skin, and constituting a good warm clothing fitted for defence against the rude winds of a lingering spring.

It is said that as the fleece is already much loosened the sheep feel little or no pain from the operation, and were the manipulation delicate and careful we might agree to the truth of the assertion; but from the fact that a great many hairs are also pulled out and mingle with the wool, we cannot help thinking that the operation is conducted rather with a view to dispatch than to care and delicacy. These hairs are indeed so numerous that they have to be separated from the wool before it is fitted for any useful purpose. The operation of *rowing* being over, the ram lambs are next examined; those with the worst, lightest, and coarsest wool are selected to return in their natural condition with the flock to the bleak mountains, but those which ought to have been chosen for this purpose, viz. such as yield the finest and best fleece, are rendered useless for breeding purposes. Such a system can only be the result of ignorance and the most short-sighted policy; it is as if the sheep-keeper purposely aimed at the deterioration of his stock; and the fact is he regards only the advantage of the day, and cares nothing about the future. We sometimes see such principles, or rather absence of all true principle,

adopted in commercial transactions; the advantage of to-day is preferred at any risk to prospective benefits. We trust that the day of better sheep management has dawned upon Shetland, but the system was formerly productive of great evil; some wool was very admirable—as chance would have it, other sorts of wool were worthless. The best, according to Anderson, was a fine combing wool (evidently a middle wool). “It has,” he says, “a peculiar softness, and is much finer than any combing wool of the growth of this kingdom that I ever saw, but it is by no means equal to the Spanish wool (a short staple), nor does it seem to be capable of being spun in any other manner than as worsted.” And elsewhere he adds, “Even for the purposes of worsted yarn there is so great a difference in the fineness and value of the fleece that stockings have been manufactured from one sort which sold at two guineas the pair, while those woven from the wool of other sheep would have been dear at sixpence.”

The best wool of the Shetland sheep is really peculiar in its quality; for stockings, gloves, and light fabrics, as fine shawls and other delicate tissues, it appears to be admirably adapted, and by judicious cultivation it is doubtless susceptible of improvement, not by crossings with other sheep, but by perseverance and judicious selections of the breeding stock from the best of the best flocks.*

When the rowing of these sheep is finished they are turned loose again. In a short time the wool begins to grow, and when it has gained a moderate degree of length the hair in its turn begins to fall off; so that after rowing hair is the only coating, and afterwards, during the brief summer, wool. But as the autumn advances the hair is rapidly renewed, the wool lengthens, and

* A writer on the productions of the Shetland Isles says, “Who has not heard of the softness and fineness of Shetland wool? I do not know the reason of its extreme softness. Is it the scanty food, or something peculiar in our herbage? Or is it merely the particular breed? Partly all these causes I imagine, for the wool degenerates when the sheep are removed to more southerly latitudes, or to better pastures in their own. They are of small size, the mutton is highly-flavoured and dark-coloured, like the Welsh, the wool is of different shades of brown colour, gray, and black, as well as white. I trust the benevolent feelings of my readers will prompt them to a more lively interest in this the staple produce in these poor and lonely isles, when they are informed that when the hardy adventurous fisherman seeks his livelihood on the dangerous ocean, the females of his family add materially to their too often scanty resources, and at least always provide their own clothing, by the produce of their knitting, which is indeed the only remunerating branch of industry within their reach. The wool is so fine that it may be spun into a thread as fine as a cambric one, and this on a common lint-wheel. Some idea of this may be formed from the fact that one thousand yards of thread are frequently spun from one ounce of wool, each thread being threefold, or three thousand yards in all. Stockings knitted from thread of this quality are so light and fine as to be capable of being drawn through a finger ring, and for such so high a price as two guineas, and even more, has been paid. These used to be the most *recherché* articles of Shetland manufacture; but within these few years the cottage girls knit a variety of elegant shawls and scarfs in numerous and ingenious patterns, mostly their own invention, which are as beautiful as lace, and not above three or four ounces in weight.”

by the setting in of winter the sheep is clad with an outer coat of long hairs and an under coat of deep fine wool; thus defended, it is enabled to endure the rigour of the winter, even in its bleak and dreary abode. Yet winter is a season of suffering and privation; not only are the flocks exposed to “the pelting of the pitiless storm,” but to the utmost dearth of provisions. At this season, as if guided by instinct, the sheep patiently wait on the barren hills for the ebb of the tide, the influx of which, boiling and agitated by the tempest, tears up and strews along the high tidal line of the coast abundance of sea-weed; when they perceive the tide retiring they descend the precipitous crags and difficult rocky steeps bordering the shore, and then begin to feed on the saline but mucilaginous sea-weeds now exposed upon the beach. Here they continue till the influx of the tide warns them to retire; they retreat as it advances, but many a straggler is hemmed in by the rolling sea, at the base of some perpendicular mass of rock, which enfeebled by want it in vain endeavours to scale, and is overwhelmed by the surge; others seek refuge on ledges or in rifts, from which they are washed away by the dashing waves.

We may here observe, that in the high latitude of Shetland the light of day at Midsummer never totally disappears, and the smallest print can be read at midnight, when the lingering rays of the preceding day mingle with and give way to the early dawn of the morrow. During winter the nights are proportionally long and dreary, and in the month of December the sun is not above the horizon more than five hours and twenty minutes. This dreary time is a season of storms and tempests, and winter indeed “lingers in the lap of spring,” for spring is not perceptible till the end of April. The surface of these islands is rugged and wild, yet tracts of cultivated and fertile land and meadows, green in summer, along the valleys opening to the shore, contrast with the dark mountains and bold towering headlands which frown over the waters at their base.

Such are the characters of the Shetland Isles, which contain about 100,000 sheep, pure and mixed, and from which, under a good system of management, the inhabitants might derive no trifling profit. Their losses in the flocks are attributable to themselves, for the ravages of the eagle, though far from being unfrequent, cannot for a moment be compared to the destruction arising from a want of some shelter during winter and a small supply of food. Stalls or pounds might be constructed on the hills, and coarse bents, grasses, and heaths be cut and dried in the summer, and stacked to serve as winter fare. In the Shetland Isles, however, the culture of the soil, and of horses, horned cattle, and sheep, is only of

secondary consideration both to landlords and tenants, who direct their chief attention to the valuable fisheries round the coast. The fisheries form in fact the main sources of wealth to the inhabitants, and therefore constitute the most important branch of industry. All the small tenants are fishermen, and only cultivate a trifling plot of land in order to raise a scanty supply of food for themselves and their families, while they devote the best part of their time to fishing. Many possess cattle and sheep, but these are neglected for the fishing; for the lands are let "under condition that the landlord is to receive all the fish caught by his tenants at a certain fixed price, which enables him to derive a profit from the resale of it; while on the other hand the landlord is the purveyor of the tenant's fishing materials, and often of a great proportion of his food, from which a profit also arises. Under such a system agricultural improvements cannot be expected. The tenant also has no lease, which if granted him on reasonable terms might stimulate him to active exertions. The delivery of perquisites to the landlords, such as fixed quantities of butter, oil, and hides, and the exactions of small tithes and personal labour, in addition to the rents of their small farms, have a further effect in cramping the industry of the tenants."

To the great landowners we look for the improvement of every sort of live stock, but where their interest lies in a very different channel it will not surprise us that they should sedulously pursue it. Yet in our humble judgment the Shetland sheep, as far as their wool is concerned, offer a source of profit not to be neglected. One of the most graphic and truthful descriptions of the Shetland Isles, in which the habits, feelings, and modes of life, from the Udaller or landed proprietor to the small tenant, alike fisherman and farmer, are depicted, is to be found in Sir Walter Scott's admirable novel, *The Pirate*. In such remote portions of an empire changes are slow. Old habits and customs are adhered to with inflexible pertinacity; and although within the last few years circumstances have occurred to open the resources and increase the general prosperity of these islands — although Scottish proprietors have succeeded to the possessions of the Norse Udalers, and although steam-vessels have opened a free communication between this *Ultima Thule* and the chief towns and cities in Scotland, still old habits, old manners, and old feelings retain their hold on the great body of the people. The sea is still the harvest-field of the Shetlander, and his flocks are the seals in the deep sea-caves along the rocky coasts.

Before we leave Scotland and its islands, a small sea-girt spot, south of the Scottish mainland on the west, and lying in the Irish Channel, demands a brief notice. We allude to the Isle of Man, anciently governed by a succession of Nor-

wegian kings, and still abounding in Danish remains and Runic evidences of the dominion of the northmen. The Manx language, however, is a dialect of the Erse or Celtic. In this island the native sheep are of small size, and very much resemble the hill sheep of Wales. They are long-backed flat-shouldered animals, with short or middle wool. Some are horned, others are polled; most are white, but black and russet brown varieties occur, while many have a patch of the latter colour on the neck. The russet brown or snuff-coloured sheep are termed the Loughton race. They are said to be peculiar to the island, are slow feeders, and long in coming to maturity. Their wool is much used for making stockings; it is very fine, and the mutton of these sheep is much esteemed. In the low grounds a larger sheep with longer wool prevails, now greatly intermixed with various breeds, and therefore destitute of any original peculiarity.

We here close our outline of the short (or as most may now be called, the middle) woolled breeds of our native sheep. To re-enumerate the causes which have led to the diminution in importance and value of our home-grown short wool, formerly so much in request, and the change into a middle wool fitted for combing, which it has gradually undergone, would be an unnecessary labour. These have been sufficiently explained. We can import far finer short wool for the manufacture of broad-cloth than our native sheep will yield, and that too, all things taken into consideration, at a price below the sum per pound which would remunerate our wool-growers at home. Wisely, therefore, have they aimed at the transformation of the old short wool into a material fitted for new and more general purposes, and at the improvement, in form, weight, and early maturity, of the breeds in question, points which concern the interests of the sheep-farmers, whose profit depends on the latter points in an especial manner, and to whom a twelvemonth's provision for a flock is a matter of consideration. It is his interest to feed off his sheep as rapidly as possible; and owing to the modern improvements of the more celebrated breeds, and to the advances which have been made in agriculture, in the produce of root-crops and artificial grasses, the same extent of land which once returned a ripe sheep every fourth or fifth year, will give us one every second or third year, supposing the lamb from its birth to have been depastured upon it; but, supposing the sheep to have been purchased at the age of eighteen months, that is, a shearling, then the same land will afford a sheep in full condition for the butcher at least yearly, together with a clip of wool. Five-year-old mutton is now no longer known, except in the case of breeding ewes. Many of our breeds are ripe at two years old, and others at two and a-half years and three years; and not only so, but the space of land once only capable of

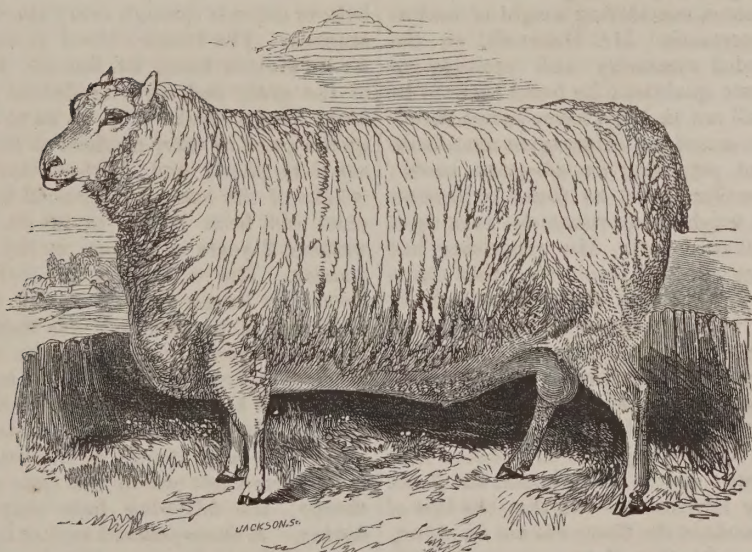
affording sustenance for one sheep, will in many instances feed and bring into condition three or four, such has been the progress of agriculture, and so decided have been the improvements of sheep-husbandry.

We shall now turn to another class or group of sheep termed the Long-woolled—a group of the utmost value, and of ancient standing in our island; one, moreover, which by indefatigable in-

dustry and consummate skill has been elevated to the highest degree of perfection, and which is the boast of our island. These sheep are, it is true, not adapted for every locality—they claim their own, leaving the high downs of our southern coast, and the bleak mountains of our north, to other races; yet of these races many owe their improvement to a cross of the finer kinds of long-wools.

CHAPTER VII.

THE LONG-WOOLLED SHEEP.



LEICESTER SHEEP.

UNDER this head range the old and new Leicesters, the Teeswaters, the Lincolns, the Cotswolds, the Romney Marsh, and some other breeds of sheep for which our island is noted. From the earliest times it contained long-woolled sheep, and this breed has never lost its distinguishing features. Its origin is lost in remote antiquity. Where it now reigns predominant there it has existed time immemorial. It claims the green swards and luxuriant pastures of our midland counties as its peculiar province, not perhaps its exclusive province, but as its "*dilecta sedes*."

Of these breeds the Leicestershire strain, from its importance and the part it has taken in modifying not only the allied long-woolled races, but some also of the short-woolled stocks, first demands our notice.

Mr. George Culley, in his excellent *Obser-*

vations on Live Stock, evidently gives more credit to Mr. Bakewell for his improvements in the old Leicester breed of sheep than in the long-horned breed of cattle; in both instances indeed this great agriculturist produced the most important alterations, nevertheless the effects of his skill and industry as respects the latter have proved evanescent. The dynasty of the long-horns has passed; but the Dishley breed of sheep, established by him, still retain their pristine qualities, and are unrivalled in their own country or in the world.

It was about the middle of the last century that Mr. Bakewell, of Dishley in Leicestershire, first applied himself to the improvement of the old Leicesters. (See note, p. 41, 'Ox.') This old breed had many good points, yet it had its defects, and these of no trifling character; it was large,

heavy, and coarse-grained, the mutton having little flavour, and no delicacy; it was long in the carcase, flat-sided, large boned, and clumsy; the ewes weighed 18 or 20 lbs. the quarter, the wethers from 20 to 30 lbs. The wool measured from 10 to 15 inches in the length of the staple, and was variable as to quality, but generally coarse. These sheep were slow feeders and returned little profit.

Such was the stock, common to Leicestershire and the adjacent counties, on which Mr. Bakewell began his course of experiments; in the prosecution of which he violated all the old axioms of his day, and proceeded upon principles totally at variance with those by which the breeders had previously regulated their practice. They aimed at size, irrespective of symmetry and aptitude to fatten; and at heavy fleeces, considering weight of wool as of primary importance. Mr. Bakewell, on the contrary, regarded symmetry and aptitude to fatten as first-rate qualities; he found these to be inherent in small not in large heavy-boned sheep, which latter consumed an extravagant abundance of food without returning an adequate profit; whereas the smaller sheep he found to increase more rapidly in weight, proportionately, even upon a less consumption of diet. His experience had also taught him another point, viz., that sheep carrying a heavy fleece had always less aptitude to fatten, and were far slower in ripening than those whose fleece was moderate; and he considered symmetry and early ripening to be of more importance than the loss of a few pounds in the fleece. In short, he considered that the value of the carcase was the first object to be attended to in breeding of sheep; and he looked upon the fleece as of secondary importance—not that the loss of two or three pounds in the fleece was not an object, but still he thought that if to preserve this the farmer not only lost ten or twelve pounds of mutton by it, but had to feed his sheep for twelve or eighteen months longer than he ought, he would pay dearly for his three pounds of wool extra. Mr. Bakewell was right; and on these principles he addressed himself to his task.

He began the plan of selection; he picked out for his breeding stock sheep of the smaller size but of the best symmetry, choosing both rams and ewes of the most promising appearances, and especially such as showed a tendency to fatten kindly. From the lambs of this first stock he again made his selection, and ventured even to breed in-and-in till he attained his object, feeling assured that the ground-work once laid fairly down all other points were at his command. Thus he persevered till he established the celebrated Dishley breed of sheep, or the new Leicesters of the long-woolled race, sheep without a rival. Let us here turn to the account of this breed given by Mr. G.

Culley, an enterprising and skilful farmer of Northumberland, who afterwards carried out Mr. Bakewell's views, and effected in the north what the latter had accomplished in the midland counties, not without some points even of improvement, though he modestly gives the whole credit to Mr. Bakewell; of his own labours indeed he says nothing, but they are not to be forgotten.

Speaking of the Dishley breed Mr. Culley, in his quiet unadorned style, says, "They are peculiarly distinguished from other long-woolled breeds by their fine lively eyes, their straight, broad, flat backs, their round barrel-like bodies, very small bones, thin pelts, and inclination to make fat at an early age. This last property is most probably owing to the before-mentioned qualities, and which from long experience there is reason to believe extends through every species of domestic animals. The Dishley breed is not only peculiar for its mutton being fat, but also for the fineness of the grain and superior flavour above all other large long-woolled sheep, so as to fetch nearly as good a price in many markets as the mutton of the small Highland and short-woolled breeds. The weight of the carcase in general is—ewes, 3 or 4 years old, from 18 lbs. to 26 lbs. per quarter; wethers, 2 years old, from 20 lbs. to 30 lbs. per quarter. The wool upon an average 8 lbs. per fleece, its length from 6 to 14 inches, sold in 1792 at 10*d.* per pound." He then adds, "There are two reasons for killing the wethers at two years old; first, they leave the most profit, and secondly, if kept longer they get too fat for genteel tables. To people who are strangers to these sheep this may appear problematical (let it be remembered this was in the time of slow feeding sheep); the following facts may remove their doubts. A three-year-old wether belonging to the author (Mr. Culley) was killed at Alnwick by Mr. James Bolton the 2nd of October, 1787, which measured seven inches and one-eighth of solid fat on the ribs, cut straight through without any slope, and his back from head to tail was like the fattest bacon. It is very common for two-year-old wethers to cut four inches thick of fat on the ribs, and from two to three inches all down the back; even ewes of this kind which have bred and suckled lambs till July, when killed about the Christmas following will frequently measure four or five inches thick of fat on the sides, and two or three inches down the back all the way from head to tail; and though the breed is not eminent for much tallow, yet ewes under such circumstances generally produce from 18 lbs. to 24 lbs. of tallow each. To weak appetites it is not so inviting as the leaner mutton. The weight of wool clipped from these sheep is not so great as from some other long-woolled breeds, but the wool of this breed has hitherto been only a secondary consideration. The

quantity and quality of the mutton obtained at the *least expense of food* was the great object of the first improver. This point gained, a new field opens to the experimental rural philosopher, to cover these good carcasses with the most valuable fleeces." Such is the testimony of Mr. Culley. But what an alteration is this from the slow-feeding, coarse-grained, heavy-boned stock on which Mr. Bakewell began his experiments. This change was effected by selection—selection quietly persevered in; but what followed? A total transformation of all the old long-woolled sheep of our island into renovated animals. The Dishley breed was destined to effect a general and beneficial alteration throughout the flocks of at least the greater portion of England.

When the reputation of the Dishley stock was established, Mr. Bakewell commenced the plan of letting out rams for the season—a novel experiment, but one calculated to produce the most important advantages; and yet because it was novel, although his terms were very moderate, he found great difficulty in inducing the farmers to concur with him in his plan. His whole scheme of improvement was ridiculed and opposed, and most so by those who lived in his immediate neighbourhood. He shared the fate of most benefactors of their race, and had to contend against ignorance, prejudice, and envy. After a struggle of twenty years he gained his point, and triumphed over all his opponents. In 1760 it was with difficulty that he let three rams for the season at 17s. 6d. each. In 1780 he received ten guineas each for the hiring of some of his best rams, and in 1784 and 1785 some were engaged at the expense of 100 guineas. In 1786 he let out one ram to a flock, one-third of the ewes being his own, for 200 guineas, rating the entire service of the ram at 300 guineas. In that year he received upwards of 1,000 guineas for the letting out of rams. In 1789 he cleared 1,200 guineas by three rams, and 2,000 guineas by seven others, exclusive of a sum of 3,000 guineas for the use of the rest of his stock, received from the Dishley Society (of which he was the founder).

One ram of first-rate excellence, called Two-pounder, he let out to two breeders, receiving from each 400 guineas, reserving one-third of the ewes for himself; the value of the ram for the season being estimated at 1,200 guineas. It cannot be surprising that other farmers, whose flocks had now improved and were in fact of the Dishley strain, should imitate the practice of the great improver of the breed, and in fact the once novel and despised plan became not only established but a source of considerable profit; moreover, it excited a spirit of emulation, for a second-rate ram would not be deemed worthy of notice.

Mr. Bakewell and other farmers kept a certain

number of rams at home, for admission to which the price varied from 10 to 60 guineas per score of ewes. The choice of the ram was determined by the object of the breeder. If he wished to establish a breeding stock, and himself possess rams valuable for hiring out, he selected one with all the Dishley excellences—head small, bone light, symmetry admirable, flesh good, and wool not heavy, and of course he paid accordingly; but if he wished merely for wethers, and a flock of sheep to be fattened as rapidly as possible for the butcher, strength of frame, stature, and good symmetry were the points he chiefly regarded. In the latter instance no difficulty, when the Dishley breed had begun to extend its influence, could be experienced.

In the meantime the Dishley Society was established, and a series of rules for the guidance of the members, and to be strictly observed by them, were laid down. These rules on the whole exhibit no little tincture of the spirit of monopoly; but before we condemn them let us go through years of persevering labour and anxiety, with disappointments to meet, and difficulties and opposition to encounter, and then, with our personal interests deeply concerned, set ourselves up as judges. Who would not monopolize if he could? We doubt the man who affirms the contrary. The main rules of the Dishley Society may be enumerated as follows:—

1. No member shall use a ram which does not belong either to Mr. Bakewell or to one of the members of the society.
2. No member shall give his rams at any season of the year any other food than green vegetables, hay, and straw.
3. No member shall let more than thirty rams in any one season.
4. No member shall let a ram for less than 10 guineas to any person, nor for less than 40 guineas to any person who himself lets rams.
5. No one ram shall be let to serve the flocks of more than two persons.
6. No member shall let a ram to any one who lets or sells his rams at fairs or markets.
7. No member shall take in ewes to be served by more than one ram at his own residence, in any one season, unless they belong to members of the society, nor to be served by any ram he uses for his own flock, with the same exception.
8. Mr. Bakewell engages not to let any ram for less than fifty guineas to any person residing within one hundred miles from Dishley.
9. No member shall let a ram to any person residing within thirty miles from Leicester, and not being a member of the society, who shall have hired a ram of Mr. Bakewell during the preceding season.
10. No member shall sell any rams or ewes of his own breed to breed from, unless he sells his

whole flock of sheep, except to members of the society.

11. From the 1st to the 8th of June the members shall not show their rams except to one another. They shall begin their general show on the 8th of June, and continue to show their rams till the 8th of July. From that day till the 8th of September they shall not show them to any one, but shall then open their show again, and continue it until the end of the season.

12. On the 8th and 9th of June, although the rams may be shown, no ram shall be let or engaged to be let, nor shall the price which will be required for him be mentioned to any one.

13. Every member refusing or neglecting to abide by the rules of the society, or withdrawing himself from it, shall no longer be considered a member. From that time he shall not be permitted to hire any ram, or share of a ram, from any of its members, until readmitted into the society at a general meeting.

Rules like these could not long retain their force. There is nothing in them to restrain the improvers of breeds, not members of the society, from acting as they pleased; and as for confining and curbing the current of improvement when it has once commenced its course, the attempt is, as it ever will be, futile.

The improved Leicesters are not adapted for a scanty pasturage, over which the sheep must travel all day in order to procure a sufficiency of food. They require a good or at least moderate soil, and on this they fatten with incredible rapidity, and are consequently very profitable to the breeder. If in the establishment of this breed Mr. Bakewell erred it was in the very little regard he paid to the wool, in which his immediate followers imitated him, some even going so far as to prefer sheep with bad fleeces to those with good, as if a fine and perfect carcase and good wool were incompatible with each other. But this false notion is now corrected, and the fleece obtains its due share of attention. Mr. Luccock thus describes the condition of the wool of the Dishley breed after proper attention had been paid to its quality, but still as of subordinate importance to the perfection of the carcase:—

“Throughout this extensive tract (the midland counties) the Dishley breed of sheep has been generally cultivated. Its qualities have been infused not only into flocks which graze upon the most valuable lands, but into those which lodge upon fallows, and in some instances have penetrated the close-bitten commons. The staple which it produces is from five to seven inches long, commonly well formed, and of a colour beautifully white; and there are few districts in the kingdom, I conceive, where the fleece is kept so clean or sent to the market in such good order, and not many where the grazier

has been more amply repaid for his attention to the coat as well as the carcase of his sheep. When compared with the ancient stock of the county they yield a larger quantity of wool on a given surface than that formerly produced; and being cleaner than the sheep formerly were, the intrinsic weight of the wool produced by an individual is not very deficient. The fleece is softer, finer, and more evenly grown, possessing also some other qualities of wool in great perfection; and although too short and weak to be admitted among the first ranks of combing wool, it is well adapted to the manufacture of worsted yarn, and has become very useful in the hose trade.”

But before the improvement of the fleece was added to that of the carcase, the Dishley breed, for the establishment of which Mr. Bakewell had to contend against various kinds of opposition, had attained to the highest celebrity. In Nov. 1793, Mr. Paget, of Ibstock, a coadjutor of Mr. Bakewell, and a most persevering and spirited cultivator of the new Leicesters, sold a stock of ewes by auction, and the prices they realized are positively astonishing, and prove the current opinion of the day. The list, leaving out the names of the purchasers, is as follows:—

5 ewes	62 guineas each,	310 guineas.
5 shearlings	52	260
5 ditto	45	225
5 ewes	30	150
5 "	30	150
5 "	29	145
5 "	25	125
5 "	22	110
5 "	22	110
5 "	20	100
5 "	20	100
5 "	20	100
5 "	20	100
5 "	20	100
5 "	20	100
5 "	18	90
5 shearlings	17	85
5 ewes	16	80
5 "	16	80
5 shearlings	16	80
30 ewes before sale	20	600
by private contract)		

130

3,200 guineas.

With respect to the quality of the mutton of the improved Leicesters, we do not estimate it so highly as that of some of the short-woolled breeds. When not over fat it is tender and juicy, but destitute of high flavour; but when fattened to a high degree, the interstices of the fibres of the muscles are replete with fat in such a manner that the line of distinction between fat and lean is

almost as it were lost; the carcase appears to be a mass of fat, and is anything but attractive. Besides, such meat is not profitable to the purchaser, though it may be to the cook. We admit, however, that it is the grazier's fault if he carries the fattening process beyond the point at which he ought to stop, whether he regards his own profit or the interest of the consumer. It is the character of the breed to ripen early and quickly. As soon as the sheep are in a proper condition for the butcher, the grazier, instead of wasting more food upon them, should get rid of them, and commence the feeding of another lot, to be disposed of in their turn as soon as ready.

It is for the accumulation of outside fat that the Leicesters are chiefly remarkable. They have comparatively little loose inside fat or tallow, a point of some consequence to the butcher, who deems this as adding to his profit. By way of a counterbalance, however, the smallness of the head, the thinness of the pelt, and the general greater weight of the carcase than the appearance of the animal would indicate, should be taken into consideration. Whatever it may be to the butcher, "this diminution of offal is advantageous to the grazier; for it shows a disposition to form fat outwardly, and is uniformly accompanied by a tendency to quickness of improvement." In this latter quality the new Leicesters, *ceteris paribus*, are unrivalled.

The new Leicesters, with all their good qualities, are not a hardy race, neither are they so prolific as many other breeds. The ewes seldom produce twins, nor indeed did the founders of this stock deem the production of twins desirable. They aimed at bringing forward the lamb as early as possible, and rightly considered that few ewes could produce two such lambs as would meet with their wishes and realize their object. The fact moreover is, that the exclusive attention paid to the establishment of a race, the vital energies of which were to be exhibited in the attainment of early maturity and in the quick accumulation of fat, while productive of the results aimed at, necessarily entailed counterbalancing deficiencies. A tendency to rapid fattening and early ripeness is not coexistent, as a general rule, with great fertility. In this point then the new Leicesters are defective, but less so than formerly. Still the ewes do not yield any great abundance of milk, and the lambs are tender, delicate, and unfitted to endure any great inclemency of weather.

Such then are the new Leicesters, to which so many other breeds owe their improvement by crossing; indeed, if we limit our attention to this part alone of their history, the benefits resulting from them will be found as important as they are extensive. Not only have they improved the long-woolled races of our island, but also various strains

of the short-woolled sheep, sometimes perhaps to the diminution of the hardihood of the latter, and always to the increase in the weight of the fleece and its acquisition of greater length and fineness of staple, changing it from a clothing wool no longer marketable into a valuable combing *middle* wool for which there is a constant demand. In the midland counties the influence of the new Leicesters is everywhere apparent; if we visit the southern and western counties we still observe the effects of their introduction; and the same observation applies to the north and even to Scotland, of which the Cheviot sheep owe to them many of their present excellences, as early ripeness, improvement of fleece, and amelioration of form. It would be folly to attempt to naturalize the new Leicesters on coarse lean pastures, on wilds, heaths, and mountain moorlands; they would rapidly degenerate, and few of their lambs with the best care would survive the winter; but, as in the instance of the Cheviots, the hardy mountain sheep may derive no trifling improvement from a cross, and that too without a loss of hardiness.

With regard to the extent of the improvements effected in our long-woolled breeds of sheep by means of the new Leicesters, they will be best appreciated from a slight sketch of the history of the principal breeds coming under that denomination.

There has long existed in the north, in the country of the Cheviots and the black-faced sheep, a long-woolled breed extending along the sea-coast of Northumberland and Durham. This sheep possessed many good qualities, and afforded scope for improvement. Its aspect was lively, its contour was very tolerable, its limbs were clean, and its wool was thick and moderately fine. Already had this breed been crossed with the Lincolnshire and the Teeswater, but in neither case with any decided advantage, and the breed remained in its original condition.

The first attempt at the improvement of this stock appears to have been undertaken by Mr. Charge, of Newton, on the Yorkshire side of the Tees, who brought to Morpeth some rams of the Dishley breed; but the farmers did not perceive their merits, he could not let them for anything like an adequate price, and was consequently disappointed in the result of his praiseworthy endeavours.

It was shortly after this occurrence that the Messrs. Culley commenced their labours on the farm of Fenton, near Wooller, in the immediate vicinity of these sheep. These admirable farmers were the contemporaries of Mr. Bakewell; they had associated with him, they had watched his endeavours, they saw his success. With the merits of the newly-established Dishley breed they were familiar, and they were acquainted with its proper management.

Their first care was to procure some of the Dishley or new Leicester sheep, and then to apply themselves to the arduous task of improvement, endeavouring to effect in the North what Mr. Bakewell had done in Leicestershire and the adjacent counties. In spite of every obstacle they resolutely persevered, and after a long struggle finally triumphed. One great difficulty in their way resulted from ignorance. A breed of sheep from the edge of the Yorkshire wolds, in which the Lincolnshire strain greatly prevailed, was held up by various rival breeders as the most fitted for the improvement of the Northumberland long-wools, and rams were brought to Morpeth for the purpose of letting. These sheep were large boned, had heavy clumsy heads, and a coarse, shaggy, curled fleece. These rams were preferred by most of the farmers, who without any reason expected great benefits from such a cross. Mr. Culley's prime Leicesters were for a time eclipsed; even farmers who had experienced the advantage of breeding from Mr. Culley's rams forsook him for a time to try this vaunted but unworthy stock. The most sensible however soon discovered their error, and returned again to Mr. Culley and his brother before any great mischief had resulted. Unfortunately all were not so readily undeceived, but the time came when they were forced to admit that this Lincolnshire race was actually destroying every good quality possessed by their own old breed; they were mortified, and turned from the once esteemed and vaunted breed with utter contempt. The Messrs. Culley quietly pursued their course, and it was now their turn to receive the reward which they deserved so well. The opposition had only delayed their triumph, and more firmly established the superiority of their breed. From this time the ascendancy of the Leicesters was established, and so continues.

Mr. George Culley, speaking of these sheep, says, "Our mode of management of this breed is as follows:—The ewes generally lamb in March, when we give them a few turnips to increase their milk; at the latter end of June, or the beginning of July, the lambs are weaned and sent to middling pastures; the ewes are milked two or three times to ease their udders, and such as are not meant to be continued for breeding are culled out and put to clover; when this fails they get turnips, and are sold about Christmas very fat to the butchers; price from 34s. to 30s. per head (in 1807).

"The lambs after being weaned take the name of hogs. They are generally put to turnips in the beginning of November (as we find it prevents a disorder called the Blackwater), and continue at them to the middle of April or the beginning of May, when the wether hogs are put upon good pasture or second year's clover. The second winter they have turnips till the clover is suffi-

ciently grown to receive them, which is generally about the middle of April. They are clipped about the middle of May, and generally all sold by the middle or end of June. Morpeth is our best market, where the two-shear wethers have been sold for the last three years at from 40s. to 50s. per head.

"We generally reckon one-third of the ewes to have two lambs each; that is, every sixty ewes to have eighty lambs. The ewes are put to the ram so as to have lambs at two years old, and are kept for breeding until three or four years old, except such as are of particular good forms, or have other valuable properties; these we keep as long as ever they will breed; such as are defective in shape, suspected of being slow feeders, or as having other unprofitable qualities, we never attempt to breed from."

The change which Mr. Culley's variety of the Dishley sheep effected among the old long-woolled sheep soon became very decided; they rapidly improved, and have by repeated crossings in a great measure merged into the Dishley strain.

Another long-woolled breed of the North is or rather was well known as the Teeswater. It derived its name from the river Tees, which divides the county of Durham from Yorkshire, on the borders of which, on each side of the river, it was occasionally bred, its range being limited to the lower grounds. The old Teeswater, as it once existed, is not now to be seen; it is so crossed and recrossed by the Dishleys that it may be said to have merged into them, and lost its original distinctiveness.

The old Teeswater, according to the opinion of Mr. Culley, was an offset of the old Lincolnshire stock, but better formed in the carcase, finer grained in the flesh, and smaller in the bone, while it exceeded the latter in size, and was the largest breed in this island; the average weight of two-year-old wethers being from 25 lbs. to 35 lbs. per quarter; some, indeed, at four years old were fed to a far greater weight, even to 55 lbs. per quarter, and upwards. Mr. Thomas Hutchinson, of Stockton" (says Mr. Culley), "who was an eminent breeder and grazier, had a wether sheep which was killed at Darlington about Christmas, 1779. The four quarters averaged 62 lbs. 4 ozs. each, besides 17 lbs. of tallow, which is the greatest weight, by several pounds per quarter, I ever heard of a sheep weighing; he was of the true old Teeswater breed." This breed was tall, clumsy, white-faced, with somewhat drooping ears, a long face, and arched nose, the barrel was round, the ribs arched, and the back wide; the sheep were slow feeders, and not adapted for bare pastures, nor for close stocking even on the rich enclosures along the Tees. Each field would support a few only, and

in winter they required an ample provision of hay and other food, in addition to that supplied by their pasturage.

The old Teeswater breed, large as it was, possessed one quality in a most remarkable degree—namely, fecundity. The ewes almost always produced two lambs, sometimes three lambs at a birth, and on rare occasions four or even five. Mr. Culley states that a Teeswater ewe, belonging to Mr. Edward Eddison, yeaned on two occasions five lambs. She began to breed when two years old, in 1772, and then produced four lambs; in 1773 she produced five lambs; in 1774 two lambs; in 1775 five lambs; in 1776 two lambs; and in 1777 two lambs. The first nine lambs were produced within eleven months.

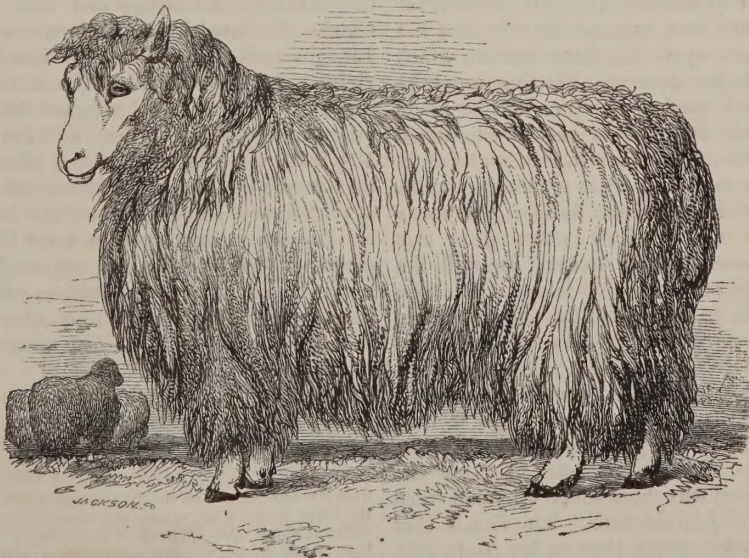
In consequence of their fertility, their size, and the fair quality of the meat, though the fleece was thin, and seldom exceeded 9 lbs., the old Teeswaters had their zealous advocates, who, as is usual, opposed any attempt at improvement. They saw, not without alarm, that the first result of a cross with the Dishleys consisted in a material diminution of size, and were naturally discouraged. Gradually, however, they began to appreciate the advantages of this diminution; they felt that it was attended by qualities of no little importance. The land, for example, could be far more heavily stocked with this new crossed breed than with the old, and would therefore, in reality, return an increased weight of mutton; the time consumed in bringing the sheep to a proper condition for the butcher was most materially abbreviated, and the carcase improved in contour—it was

rounder and more compact. The wool, moreover, was finer and closer, although somewhat shortened in the length of the staple. Yet it was rather in other qualities than in the goodness of the fleece that the improvement effected by the cross was manifest. Nor is this to be wondered at when it is considered that it was with a view to form, early fattening, and properties connected with the carcase, to the disregard of the wool, that the Dishley breed was originally established, and that it was not till a later period that the wool received its due share of attention.

In the meantime the intercrossing of the breeds continued, till at length the distinguishing features of the old Teeswater became obliterated, and a new breed occupied the banks of the river. The next step in the road of improvement was to attend to the wool; hitherto it had been harsh, and the fleece of very unequal quality, in many parts very coarse and hairy, in others tolerably fine and closer. Here the principle of selection was brought into operation, and by degrees, while the new sheep kept up all the valuable points of their carcase, they assumed a renovated fleece as valuable at the present day as that of most long-woolled breeds.

Lincolnshire from time immemorial has possessed a long-woolled breed of sheep, of which Ellis says, "They were the longest legged and largest carcased sheep of all others, and although their legs and bellies were for the most part void of wool, yet they carried more wool on them than any sheep whatsoever."—*Shepherd's Guide*.

Mr. Culley gives a somewhat different account



LINCOLN SHEEP.

of the Lincolnshires. "They have," he says, "no horns, white faces, long, thin, and weak carcases; the ewes weighing from 14 to 20 lbs. per quarter; the three-year-old wethers from 20 to 30 lbs. per quarter. They have thick, rough, white legs, large bones, thick pelts, and long wool, averaging from 10 to 18 inches, weighing from 8 to 14 lbs. per fleece, and covering a slow-feeding coarse-grained carcase of mutton." "This breed," he adds, "is most prevalent in Lincolnshire; which fertile district has the same right to be called the *mother county*, or country for *long-woolled sheep*, that Lancashire has to long-horned cattle. But the comparison may be carried further, for as this last-named county, from paying too much attention to big bones, hides, and horns, suffered the Leicestershire and Warwickshire breeders to steal from them their valuable breed above referred to before they were well aware of it, so also the Lincolnshire breeders, by too great a fondness for heavy wool and large-boned sheep, suffered the same discerning breeders (Mr. Bakewell and others) to rob them of a much more valuable breed of sheep, which they were undoubtedly first in possession of, before they were sufficiently sensible of the value of them.

"It is true that the Lincolnshire breeders can justly boast of clipping the greatest weight of wool from a given number of sheep of any other set of people in this island; but then this very heavy wool seldom or never fails to cover a very coarse-grained carcase of mutton—a kind of mutton well known for its coarse grain and big bones in the London markets, which not only sells for less money by the pound in the metropolis than any other kind of mutton, but in every market in the island wherever it happens to have been exposed for sale, and has brought an odium upon the large mutton which the best kinds do not deserve. Yet this is not the worst of it, for this kind of sheep cannot be made fat in a reasonable time in any part of the island except Romney Marsh, their own rich marshes in Lincolnshire, or some very rich grazing grounds. Perhaps this is the best reason we can give for a set of sensible men so long adhering to this coarse-grained slow-feeding tribe. Indeed the prodigious weight of wool which is annually shorn from the sheep is an inducement to the marshmen to give great prices to the breeders for their hogs, or hogrils as they are there called, where they must be kept two years before they get them fit for market; yet in the meantime they get three clips of wool from them, which alone pays them well in those rich marshes." We cannot help thinking the latter a good reason why these sheep were esteemed in the marshes of Lincolnshire. The fact is, that Mr. Culley, like his great master Mr. Bakewell, utterly disregarded wool; these breeders looked at it as of very second-rate importance, and deemed

carcase and early fattening to be all in all. By neglecting the fleece as they did, they left work for others to accomplish after them, for it soon began to be discovered that wool was important, and that good wool might be brought to cover a good carcase.

On the other hand, it may be admitted that the Lincolnshire farmer too much neglected the carcase; he aimed exclusively at the maintenance of a first-rate wool-bearing animal, and he looked to wool for his profit. For such sheep his rich marsh land was expressly adapted; "they were made for and by the district on which they were found, and when removed even to good keep, but in a district of a different description, they rapidly degenerated." The fleece which this breed yielded was unrivalled of its kind, and for centuries had supplied the looms of Norfolk;* it was not very fine, perhaps rather coarse, but as combing wool it was deservedly estimated.

Thus, then, were the new Leicesters and the old Lincolns the opposites of each other. Their respective qualities were essentially different, and each breed claimed its zealous partisans. Gradually however this spirit of rivalry abated, and crosses were tried between the Leicester rams and the Lincolnshire ewes. The result as regards improvement in contour and early fattening was decisive, and the weight to which the cross breed might be brought was very great, and that too with less comparative expense of food than formerly. In Sept. 1826 Mr. Dawson of Witheall killed three most extraordinary sheep of this cross breed. The weight of one was 386 lbs. (a three-shear), the weight of another (a two-shear) 364 lbs., and of the third (a shearling) 284 lbs. In 1827 Mr. Clarke of Canwick exhibited two wether sheep in Lincoln market, the fleeces of which together had yielded 24 lbs. of wool. When slaughtered the carcase of the larger one weighed 261 lbs., the fore-quarters were each 73 lbs., and the hind quarters 57½ lbs. On the top of the ribs the solid fat measured nine inches in thickness. The carcase of the smaller sheep weighed 250 lbs.

From this we may form some idea of the propensity to accumulate fat, especially in the rich forcing marshes of Lincolnshire, which the mixed breed began immediately to display; but we question whether the quality of the mutton is materially

* Norfolk was long the principal seat of the stuff or worsted manufacture; and the name *worsted* is said to be derived from a parish in this county where woollen twist and stuffs were first made. But the manufacture was early transferred to Norwich, whence it extended to other towns. A number of refugees who from the Low Countries sought an asylum from the persecutions of the Duke of Alva introduced the manufacture of bombazines, for which this city was afterwards distinguished; crapes, camlets, and, more recently, shawls, are among the productions of Norwich. The greater part of the yarn now made use of in the Norwich fabrics is made at Bradford in Yorkshire. Worsted yarn is also largely produced in Leicestershire.

improved. Short, high-flavoured mutton, and a disposition to become overloaded with fat, are, we think, almost incompatible with each other. There is a *juste milieu*, beyond which the deposition of fat partakes more of the character of a disease than of a healthy action of the organic system. The tendency to this accumulation, burdensome to the animal, may, by selection in breeding, be made hereditary. It has been made so; and other morbid predispositions may be established in the same manner. But setting this view of the matter aside, the animal, when properly fattened, ceases, after that point is attained, to pay for its keep; and it is the interest of the farmer to sell off and make room for others.

So far it may be granted that the intermixture of the Leicesters with the Lincolns has tended to the improvement of the latter. When, however, we look at the wool we are not quite so sure that this has undergone a parallel advancement. The fleece is now lighter and shorter than it used to be; it is finer in the staple and of a better colour, but is more tender, having lost much of that toughness which is indispensable in good combing wool, while as a felting wool it has gained nothing, being as it was before, in this respect, almost at the bottom of the list. Any detriment, therefore, to its combing qualities, for which it formerly ranked so high, must be a disadvantage; and although it may be well fitted for the manufacture of some articles, it is less adapted for the better sort of worsted fabrics. If length and toughness of staple could be restored, and the fineness which it now possesses retained undiminished (and with proper care in the selection of breeding stock this may perhaps be fully accomplished), then the Lincolnshire sheep would take a high rank, perhaps the highest, among the improved long-woolled breeds of our island.

There is, however, still some difference in the characters of the wool of different breeds of Lincolnshire sheep. Those which are bred on the wolds are much deeper crossed with the Leicesters than those bred on the marshes, and the latter consequently have a coarser, longer, and heavier fleece. The wold sheep are, however, predominant, having increased of late years, and especially since the introduction of the turnip system. They are reared chiefly on artificial grasses, and some also on old pastures, and afterwards put upon turnips. Shearing takes place in June; no smearing or ointment is afterwards used. The fleece averages 7 lbs., but is heavier on coarser marsh sheep; the length of the staple varies from seven to nine inches.

Another breed of valuable long-woolled sheep is the Romney Marsh breed.

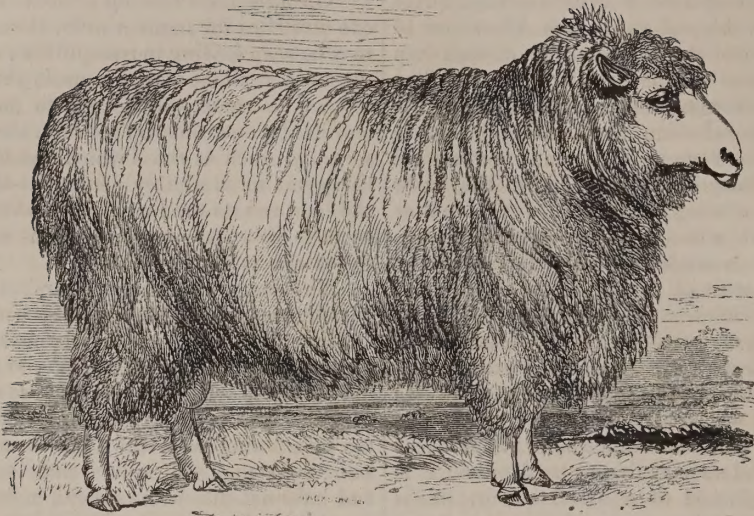
Romney Marsh is an extensive tract on the coast of Kent, reclaimed in ancient times from the sea. It is celebrated for the richness of its pasturage, and contains about 24,000 acres, and is in

one part protected against the sea by an embankment called Dymchurch-wall.*

On this level feeding ground, over which the eye stretches for many a mile, thousands of sheep may be seen feeding in tranquillity; and the picture in summer, albeit monotonous, is yet very pleasing, at least to those who delight to gaze upon flocks and herds, and contemplate calm scenes of peaceful serenity, such as those which the magic pencil of Cuypp has so admirably depicted—scenes in which the land and its productions, the sky, and the cattle seem to compose one harmonious whole, soothing to the eye as music to the ear.

The sheep which these Marshes feed are of an ancient race, which for ages has occupied the same locality, and, amidst many changes, preserved its own characteristic peculiarities. Within late years indeed these sheep have undergone some degree of modification, we may say improvement, and that too by crossing with the Leicesters, while at the same time they still retain sufficient distinctness, and have not, like some others, melted and become fused into the latter. Hardiness, the power of enduring severe cold, and the capability of thriving even with close stocking on the ground, together with good wool, were and still are among their qualities. Still, as we have said, they are modified, and to know what they were between forty and fifty years since, we must see what the writers of that day say respecting them. Mr. Price (*On Sheep*, p. 109), who was a farmer on the borders of the Romney Marsh, says of them that when pure these sheep “are distinguished by thickness and length of head, a broad forehead with a tuft of wool on it, a long and thin neck and carcase. They are flat-sided, have a sharp chine, are tolerably wide on the loin, have the breast narrow and not deep, and the fore-quarter neither heavy nor full. The thigh is full and broad, the belly large, the tail thick, long, and coarse, the legs are thick, the feet large, the muscle is coarse, the bone large, the wool long but not fine, and coarsest on the breast. They have much internal fat, and are great favourites with the butcher. They have much hardihood;

* Romney Marsh strictly speaking comprises about 24,000 acres, but when it is described, as it generally is, in connection with the Welland Marsh, containing about 16,500 acres, adjoining it on the south-west, Denge Marsh, of about 3,000 acres, which unites with the latter on the south-east, and Guilford Marsh, in Sussex, comprising about 3,200 acres, its extent may be taken at about 46,700 acres. There are very few trees or hedges in the Marsh. The fences consist mostly of ditches and rails, great quantities of wood for the repair of the latter being brought every year from the Weald and other parts of Kent and Sussex. A good deal more land is ploughed than formerly, but it seems very doubtful whether this extension of tillage has been in any respect an advantage. It is very thinly inhabited, and with respect to its air it has been said that it is bad in winter, worse in summer, and at no time good, the district being fit only for those vast flocks of sheep which feed all over it. The inhabitants are few in number, and consist for the most part of labourers, employed to look after the grounds and tend the sheep and cattle of the owners and occupiers of the land who live without the Marsh.



ROMNEY MARSH SHEEP.

they bear the cold and exposed situation well, and they require no artificial food during the hardest winter except a little hay. The wethers seldom reach the market till they are three years old; they then weigh from 10 to 12 stones of 14 lbs. to the stone, and the ewes from 9 to 11." The fleece averaged $6\frac{1}{2}$ lbs. or 7 lbs. It was very useful for home purposes, but the greater part of it was exported to the Flemish and other markets on the continent.

From the foregoing description it is very evident that there were many points in the Romney Marsh sheep which might be altered for the better. But, long habituated to these sheep, the Kentish farmers saw no fault in them, and were unwilling to risk the chance of their degeneracy by any cross, whatever might be urged in its favour. They were right to be cautious; this breed was, like the marsh sheep of Lincolnshire, formed by and for the peculiarities of their ancient territory; they were, so to speak, *indigenes* of the soil. Besides, the Leicesters were a tender race, unfitted for such a situation, and incapable of thriving there; and it must be confessed that had the cross with the Leicesters been carried to an extreme, a complete failure would have been the result; as it was—for after some time the Leicesters began to be interbred with the Romney Marsh sheep—the advantage proved very doubtful. The mixed progeny were inferior in size and inferior in wool, both as to quantity and quality; and the first feeling was that of disappointment. When, however, the farmers began to look more narrowly at

this half-bred stock they found it not altogether so bad as they first imagined; if the sheep was smaller, it was a closer, more compact, and better formed animal than the old breed, and for its size weighed heavier; it consumed far less food, and could bear still closer stocking than before; it fattened far more rapidly, was ripe a year earlier than formerly, and therefore the sooner fit for the butcher. Moreover, it laid on its fat externally, to the advantage both of the farmer and the public at large, and not as before internally, to the profit of the butcher alone. The fleece, too, if less heavy, was finer in the staple and improved in colour. The farmers now recovered from their disappointment, they perceived that they had gained an advantage; and those who had judgment proceeded to breed from this stock, making careful selections for the purpose. Thus the improved Romney Marsh sheep were established. It is still the practice to have occasional recourse to the Leicesters, in order to maintain the good qualities thence derived, but only occasional recourse; for were the Leicester strain to predominate, or even to exceed a certain point, the sheep would be too tender for their locality and lose all their old hardiness. The desirable improvement having been gained, a further admixture of the Leicester blood is not generally advantageous unless where it seems necessary, and even then selection may absolutely be the more prudent plan.

During the winter the sheep on the Romney marshes are exposed to great hardship. There is nothing to shield them from the keen cutting

blasts and violent storms, and heavy snows often bury the herbage too deep for them to obtain it by digging. At this season the dykes or trenches with which the Marsh is intersected are often a cause of great loss: they frequently become sheeted over with ice too weak to bear the weight of the sheep, and concealed moreover by a layer of snow. Deceived by appearances, the animals endeavour to cross, one following after another, and rush into perdition. Cold, and famine, and accidents, thus combine to thin the flocks, especially in seasons of more than common severity. The lambing season also is one of anxiety for the farmer; there is little on this extensive level to break the force of the keen east winds and driving sleets which at that time so much prevail. There are few hedges, few sheltered enclosures, few sheds, comparatively speaking, capable of affording efficient protection; and the consequence is, that after a bitter night the morning discloses a sad mortality among the new-fallen lambs. More shelter is now prepared for the sheep than formerly, and some farmers are wisely and humanely careful in this respect, and find themselves well remunerated for any outlay which may be necessary.

It would seem that the Romney Marsh sheep has a very close ally in a breed of Devonshire called the South-Ham Notts, if indeed the latter has not at some time branched off from the former. In figure and quality of wool they both resembled each other; but the face and limbs in the Devonshire breed were brown. This breed is now greatly modified by intermixture with the Leicesters, and with the usual results. The form is highly improved, though with a diminution of size. The disposition to fatten, and at an earlier age, is much increased, and the fleece is shortened, finer, and lessened in weight; at the same time the brown tint of the face and limbs has disappeared.

There is another breed of long-woolled sheep in Devonshire called the Bampton sheep. Some derive these sheep from the Western Down race intermixed with the old Leicester strain; while others affirm that from long antiquity the old breed has existed in the neighbourhood of Bampton. They describe it as large, white-faced, large boned, and long in the legs and body. The average weight of a fat ewe was at the rate of 20 lbs. per quarter, and of two-year-old wethers 30 or 35 lbs. The fleece was heavy, being on the average 9 or 10 lbs., but a ram weighing, as calculated by the eye, 40 lbs. the quarter, has given to the shearer 18 lbs. of wool. The wool was long, rather coarse, tough, and generally useful.

Such was the old Bampton sheep, be its origin what it may. But it has now been interblended with the new Leicesters, and the usual results have taken place. The new Bampton are almost, if

not quite, Leicesters in appearance. They have the Leicester contour and fattening capabilities, the wethers being ready for the butcher at the age of two years. The average weight is 20 or 22 lbs. the quarter. The wool is lessened in weight, in length, and toughness, it is finer but more tender, and the fleece averages 8 lbs. The lambs are more difficult to rear than formerly, and the new race has altogether lost something of its hardness; still it is very valuable to the breeder. It occupies the low and fertile pasture lands of the south of Devonshire, extending to the vale of Taunton and far into Somersetshire.

We have already noticed the short-woolled sheep of Gloucestershire, but there is a long-woolled race for which this county has long been famous, known under the name of the Cotswold breed.

We should here observe that Gloucestershire is naturally divided into three distinct districts of very different character, which may be termed respectively the Hill, the Vale, and the Forest districts. The Hill district is formed by a range of high land running entirely through the county from north-east to the south and south-west. Its course is nearly parallel to the Avon and Severn, at a distance varying from six to ten miles, and running in a line from Chipping Camden to Broadway Beacon (1086 feet high), Winchcombe, and Cleve Station (1104 feet) on to Cheltenham, which lies in a beautiful valley formed into a kind of amphitheatre by the western side of the hills. This range is called the Cotswold Hills, according to Camden, from two particulars, viz., the sheep-cotes here from old times so numerous, and the elevated nature of the tract, the term *wold* being equivalent for that of hill. From Cheltenham the high ground runs west to Painswick, where it turns more to the south, and passes Wotton-under-Edge and Chipping Sodbury, and passes out of the county into Wiltshire and Somersetshire, forming the high ground around Bath. The Cotswold range of hills divides the basin of the Severn from the basin of the Thames.

The cots or cotes on these hills demonstrate the care and attention paid to the sheep of this district in olden times, and consequently the value in which the latter were held. They consisted, according to Camden, not only of rude huts or sheds but of extensive ranges of buildings consisting of three or four low stories, communicating with each other by means of gradually-sloping ascents or pathways, so that the sheep had no difficulty in ascending to the topmost story. Thus no room was lost, and the most efficient shelter was provided for the flock either by day or by night during the continuance of winter, or at the lambing season, or when it was deemed advisable to house them.

Of the high estimation in which the Cotswold



COTSWOLD SHEEP.

sheep and their wool were anciently held we have already spoken. In 1437 Don Duarte, king of Portugal and brother-in-law to the King of Castile, made application to Henry VI. for permission to export sixty sacs of Cotswold wool in order that he might have certain cloths of gold manufactured from the article at Florence for his own private use. The fine short Spanish wool was not adapted for this manufacture, and Europe contained no long wool to be compared with that of the Cotswold breed.

In 1467, as we have previously stated, by permission of Edward IV., Cotswold sheep were imported into Spain, not as some have supposed to mingle with and improve the breed of the migratory fine and short-woolled Spanish sheep of ancient renown, but either to form the groundwork of a new long-woolled stock, or to improve some native long-woolled breed, from which serge-like fabrics requiring this kind of wool might be manufactured.

In the reign of Queen Elizabeth Markham describes the Cotswold sheep as a long-woolled and large-boned breed; and previously to her reign large exports of wool, decidedly long wool, were exported from different parts of our coast. History proves the antiquity of our long-woolled races; the enormous weight of wool from time to time exported is in itself a demonstration of its character; for example, in 1390 no less than 130,000 sacs of wool were exported from our island, and this, reckoning 364 lbs. to the sac, would amount to 47,320,000 lbs. Yet there are some writers who assure us that our long-woolled sheep do not date

their origin prior to the year 1760. "Where," says Mr. Youatt, "were the number of the short-woolled sheep to be found that would supply this immense quantity of wool besides that which was required for the home manufacture? The fleece of the short-woolled sheep would scarcely average more than $2\frac{1}{2}$ lbs. (we suspect not so much); and consequently the number of sheep which then covered our pastures must have been nearly 19,000,000, exclusive of those that were to supply the home manufactures. The whole number of sheep in England and Wales, according to Mr. Luccock's calculation, was but 26,000,000 in 1800. In 1741 it was but 17,000,000, and in 1698 they were calculated by Gregory King to be only 12,000,000. Nothing more needs to be stated in order to prove that they were long-woolled sheep which yielded this immense quantity of exported wool; and reckoning 7 lbs. to be the average weight of the fleece, 6,760,000 sheep would be requisite, still an immense number, and showing how decidedly the English people were at that time growers of sheep. After these historical notices it is really unaccountable to find such otherwise excellent writers as Mr. Herbert and others gravely tell the public that 'the first of the old Lincolnshire and Leicestershire breeds reached England about the year 1760, six or seven years after which Mr. Turner introduced into Herefordshire a cross between the Leicester ewe and the small Ryeland ram; whence the origin of the Cotswold, or large Herefordshire breed.'—*British Farmer's Magazine*, 1830, Nov.

Other writers, following in the same track,

state the Cotswolds to have been in past times short-woolled sheep, and to have been converted into long-woolled animals only within the last fifty or sixty years, although there is not a shadow of proof in support of their visionary theory. If history be consulted, and the legitimate deductions from established facts be allowed their due degree of import, no one, with Markham's express testimony before him, can doubt that the old Cotswolds were long-woolled. Drayton, who wrote in the time of Henry VIII., in rude yet not unworthy verse, gives the palm to the Cotswold sheep for its "wealthy locks," not only over the sheep of "Sarum's plain," but over the sheep of the Leominster breed, then the finest-woolled sheep of our island; and he makes *weight* of wool the point in which the Cotswolds excel. The Leominster or Leinster, he says, may excel in fineness of staple, but for abundance of wool they yield to the Cotswolds.* What, we would ask, can be more conclusive? To this is conjoined the hereditary traditions of the Cotswold farmers and shepherds themselves. Their sheep is what it ever has been, setting aside those changes inseparable from modifications in the system of farming and the encroachment of improved breeds such as the dominant new Leicesters.

The old Cotswolds were a large hardy race of sheep, big-boned, and long-woolled, and well adapted for the hill range which constituted their stronghold. To judge from the relics still extant (though not pure), they were flat-sided, deficient in the fore-quarter, heavy in the hind-quarters, slow fatteners, and clothed with along and weighty fleece, this latter being variable in quality, but always truly valuable as a combing wool. But the old breed is now more or less modified, and although it has not merged into the Leicester, it is in many parts deeply imbued with the Leicester blood; in other parts, on the contrary, where hardiness is peculiarly essential, the cross of the Leicester breed has been only carried out so far as to give those improvements which we have more than once detailed as the invariable result of even a single cross with this peculiar strain.

According to the situation of his farm and the nature of his pasturage does the Cotswold farmer manage his flock. Perhaps the prevalent breed may be half Cotswold and half Leicester. But in sheltered places and on good lands the strain of the Leicesters may be found to predominate; while in more exposed situations the farmer, finding

the Leicester cross tending not only to the diminution of the size of his sheep and of the weight of his fleeces, but to the loss of due hardiness and fertility, increases the Cotswold blood in his flock, and proceeds rather upon the principle of selection than of admixture to a rash extent with the Leicesters. In both instances the farmer is right; in the one case he has the means of feeding off rapidly, and he is content with loss of size and a lessened weight of fleece; his profits arising from early maturity, and from the capability of the land for feeding at a given time more sheep of the crossed breed than the old, so as in reality to return at a quick ratio a greater weight of mutton than formerly. To him wool is of secondary importance. The farmer whose land is exposed, and affords only a scanty pasturage, will find his profit rather in wool than in carcase; he could not, as respects the latter, compete, even if he would, with the farmer of the vale a few miles distant, but he will make up his profit in weight of wool. He therefore takes care that the old strain shall prevail over the Leicester cross (the benefits of which he is not altogether willing to lose), and adapts his plans of management to the circumstances in which he is placed. He does not lose sight of fattening qualities and early maturity; but he as little loses sight of hardiness, fertility, and size, and of weight of fleece. The right medium will depend upon many contingencies, but self-interest is generally a safe monitor when under the sway of experience.

Taking a general view of the Cotswolds we should say that like the Romney Marsh sheep they are rather modified by than absolutely absorbed into the Leicesters; as we have said, the degrees of the intermixture vary, but still, although the Leicesters are said to be gaining ground, the Cotswold strain is not obsolete; nor while the Cotswold range of hills remains what it is, are they likely to be so.

Like the pure new Leicesters, the Cotswolds or cross-bred Cotswolds have been extensively employed for the improvement of other breeds, and in many instances the latter are preferred to the former from their superior size and hardiness. In the Welsh valleys, as for example the vale of Glamorgan, the pure Leicesters, the half-bred Cotswolds, and even still purer Cotswolds, have been adopted with success, to the exclusion of the native stock.

In Oxfordshire, a long-woolled breed has long flourished on the banks of the Charwell and in other parts of the county, but the Leicesters now chiefly prevail, and many flocks of Southdowns are to be seen. A breed called the new Oxfords has been recently established. They are bred in Oxfordshire and the surrounding districts, "particularly in the neighbourhood of Broadwell, the residence of Mr. Charles Large; Charlbury, the

* Drayton typifies Cotswold as King of Shepherds; and under this personification of an idea, a sort of apotheosis, putting place for person, thus writes:—

"T" whom Sarum's plaine gives place, though famous for its flocks,
Yet hardly doth she *tythe* our Cotswolds' *wealthy locks*;
Though Leinster him exceed in *fineness* of her ore (valuable material),
Yet quite he puts her down for his *abundant store*."

residence of Mr. Smith; and Swenhampton, the residence of Mr. Handy, the most eminent of breeders; and to whom great credit is due for their exertions in raising this valuable breed to its present high state of perfection. They are of large dimensions, and have a great propensity to fatten, arising chiefly from their wide frame, quietude, and open texture of flesh, which is of quick growth, and consequently expands itself more rapidly than in sheep of other qualities; but they do not possess that exactness of form peculiar to smaller animals, though they have a better carriage. For many years the male animals have been eagerly sought after with a view to increase the size and frame of other long-woolled breeds."—*Robert Smith*. In many respects these sheep approach the Cotswolds, but are said by their admirers to yield finer-grained meat.

In taking a general survey of the long-woolled breeds of sheep as they exist at the present day in our island, we cannot but perceive the general influence which the new Leicesters have exerted far and wide in the modification of the old large-boned, ill-formed, slow-feeding sheep of the last century. Indeed we now know these latter only from the descriptions of them which have been left us. In Leicestershire, Nottinghamshire, Warwickshire, Derbyshire, and in short throughout the midland counties generally, the old long-woolled sheep, essentially the same in characters, were large, gaunt, clumsy animals, huge feeders, and slow fatteners. The farmers were content—nay more, they scorned all ideas of improvement as visionary; the sheep were what they were in their forefathers' time, and as regarded the system of husbandry in general, the great principle by which the farmer was guided was to pursue, with as little variation as possible, the practice of his forefathers. Science was not the handmaid of practical farming, the land was not economized, and time, money, and food were wasted upon animals which ill-repaid the farmer for his trouble and outlay. But the dawn of a revolution was at hand; chemistry, geology, and physiology had reared up temples in the land, whence radiated a light before which the clouds and mists of ignorance began to be dispelled. The genius of agriculture awoke from a long trance, and a new era commenced. Old plans became obsolete, and as a new system developed itself, so in a parallel ratio were improvements instituted in the breeds of horned cattle and of sheep over the country generally. Then it was that men of enterprise, acting on sound principles, aimed at the elevation of different races—at the establishment of a stock destined to effect great changes, great improvements, in all our native breeds. It was then that the improved race of long-horned cattle arose, and the still more influential breed of Dishley sheep.

From that time the star of the old unimproved races began to set; breed after breed either disappeared or became fused into this new strain, till at length the permanent establishment of the new Leicesters was achieved. The Dishley stock was triumphant.

While these alterations were taking place circumstances were in operation which led to the depreciation of the fleece of our once famous short-woolled breeds. It was less and less in demand by the manufacturer; he could import a better and finer material at a cheaper rate. Germany had risen in the list of countries celebrated for Merino wool. In England the Merinos, though promising at first, failed to produce any permanent results, at least on an extensive scale. To Germany, therefore, not excluding Spain, the manufacturer looked for his supply, and Australia put in her claims to his notice. At this juncture of affairs the short wool began to assume an altered character—it changed into a middle wool, even fit for combing; it was no longer a carding wool only, nor was it in request for fine cloths. This change arose partly from interbreeding, but perhaps more from the altered system of sheep husbandry and agriculture. The turnip and artificial grass system, by means of which not only can an ample supply of food (the year being moderately propitious) be afforded to the flock, but a double and in some places a treble number of sheep be maintained with comfort and plenty on the same area of ground. Added to all this, the increased means of fattening early and quickly, and the desire of the farmer to avail himself of these means, had their effect. He crossed, or he selected as breeding stock sheep likely to answer his expectations in this very important point, and he succeeded. But what was the result? As the carcase increased in weight so did the fleece, and its staple became longer and thicker. At first the farmer could not perceive this change, but the manufacturer quickly discovered it. It was in vain for the farmer to assert the superiority of his short wool to that of any nation. The manufacturer had only to show him Merino, or Saxomero wool, and to point to his bales of cloth fabricated from English short wool, which were now a drug in the market; the fact could no longer be gainsaid. The English short wool had altered; it had become middle wool, and though scarcely marketable for clothing purposes, it was admirably adapted for many new kinds of fabrics which ingenuity devised, and highly perfected machinery enabled the designer to accomplish. The farmer then had no room for complaint if his wool sold at something less per pound than formerly. He had increased his sheep in size and symmetry; he could rear double the number on the same ground; they came to maturity

twelve or sixteen months earlier than of old, and were fattened off with less outlay. In the meantime population was on the increase, and the demand of animal food for the supply of the markets in proportion.

"According," says Mr. M'Culloch, in his *Statistical Account of the British Empire*, "to the estimate in Mr. Luccock's *Treatise on English Wool*, the produce of wool of all sorts in England was 384,000 packs, of 240 lbs. a pack. But Mr. Hubbard, a very intelligent and extensive wool-stapler at Leeds, has shown that, supposing Mr. Luccock's estimate of the number of sheep to be correct, the quantity of wool now produced cannot, owing to the greater weight of the fleece, be estimated at less than 463,169 packs, being an increase of 20 per cent. It is therefore clear, seeing the high price to which wool has recently attained, that taking into account the greater weight of the fleece as well as of the carcase, sheep must produce more to the farmer than at any former

period. Taking Scotland and Ireland into account, the total annual produce of wool in the British empire may be estimated at about 520,000 packs." Of these, we may add, the packs of true and genuine short wool are now but an insignificant fraction. Those of middle wool, generally, but not very correctly, termed short wool (at least since the alteration) have diminished, while those of long wool have increased. In 1800, according to Mr. Hubbard, the total quantity of short wool (exclusive of lambs' wool, and wool from slaughtered sheep, &c.) amounted to 193,475 packs; of long wool, to 131,794 packs; total, 325,269 packs. In 1828 the total quantity of short wool amounted to 120,655 packs; and of long wool, to 263,847 packs; total, 384,502 packs. Since 1828 the long wool has gradually been on the increase, and the short wool on the decline; and indeed the latter has become so altered that much of it, if not all, may rank with the modern long wools.

CHAPTER VIII.

THE SHEEP OF IRELAND.



IRISH MOUNTAIN OR COTTAGH SHEEP.

FROM this sketch of the principal and most influential breeds of British sheep, we may turn to those of Ireland, an island from its climate, its pasturage, and its general character, admirably adapted for the rearing of flocks. The early

history of Ireland is enveloped in darkness. Whence she derived her earliest colonizers we cannot tell. The Scoti, who were in possession of the island at the time of the introduction of Christianity, were the successors of a more ancient

race, allied according to some to the Belgic tribes of Southern Britain, and a people called Cruithne continued long to inhabit a portion of the island distinct from that held by the Scoti. These Cruithne are supposed to have been identical with the Picts of Northern Britain; but the Scoti and the Cruithne were comparatively modern. They were rude and perhaps warlike, but to them cannot be attributed those monuments and relics of far-gone antiquity which attest the existence of a people advanced in civilization, such as "Cyclopean buildings, sepulchral mounds containing stone chambers, mines, bronze instruments, and weapons of classic form and elegant workmanship, which would appear to be referable to some of the predecessors of the Scoti, and indicate a close affinity between the earliest inhabitants of Ireland and that ancient people by some referred to a Phœnician origin, whose vestiges of a similar kind abound throughout the south and south-west of Europe." About the end of the third century *Scotia* was the name applied to Ireland, and so it continued to the beginning of the eleventh century. In the present day by *Scotia* we mean North Britain, beyond the boundaries of Northumberland. But still the Gaelic portion of the people are not Scoti, and we believe that they, the Welsh, and the ancient Irish were branches of one family. (For some interesting observations on Irish history and antiquities, see the *Penny Cyclopædia*, vol. xiii. p. 20).

When the first colonizers of Ireland or Eri took possession of this green island, did they find it tenanted by a race of sheep and cattle, as well as of gigantic deer and beasts of prey? or did they introduce into it flocks and herds, defending them from the wolf, which made the mountain ranges his stronghold, and long continued the terror of the flock? We cannot answer the question, but this we know, that as far back as the authentic records of history conduct us, Ireland possessed flocks and herds. Sheep-skins were used as cloaks or mantles, and garments of wool either woven or felted, sometimes dyed, sometimes of the natural dingy black colour of the fleece, were afterwards adopted.

To pass from times of antiquity to more modern days. Ireland long before her more intimate connexion with England was a wool-growing country. "When she fell under the alleged but incomplete dominion of England, although there were no large manufactures of woollen goods established in any part of the island, the value of her fleece was recognised in the numerous prohibitory laws which were enacted against the exportation of it, notwithstanding the impossibility of carrying them into effect. Thousands of packs of wool were smuggled away from the western coast of Ireland, and conveyed to France and to Flanders, and

immense fortunes were made by this contraband trade. There were no large manufactories, because for many an age, from the peculiarity of the civil state of the people, there was no capital to found them, there was no fuel to carry on the different processes, there was a melancholy deficiency of almost every branch of useful knowledge that could be made subservient to the purposes of such a manufacture, there was no market, and there could not be any for a considerable period, because the cottagers and the little farmers spun their own wool, and made it into coarse but comfortable garments for themselves and their families, and because the material being thus extensively used, sufficient could not be obtained for the purpose of a large manufactory except at an enormous price. There was no scarcity of sheep or wool, but the wool was bespoke, and it could not be withdrawn from its natural and long-established channel without a sacrifice in price that would materially diminish, or altogether destroy, the profit of the manufacturer." Political circumstances also had their share in preventing the establishment of extensive woollen manufactories, but into such rugged paths we will not enter. Nevertheless, much wool was spun in Ireland by the small farmers and peasantry, and converted into yarn, not only for home uses but for exportation. In 1772, 2,045 stones of wool were exported from Ireland to England, and 115,754 stones of worsted yarn, the principal part of which was sent to Norwich, and disposed of in the manufactures of that town. From circumstances to be deplored, and among them we may name the *con-acre* system, a change began to take place in the habits of the peasantry and little farmers, so that in 1811, although 2,407 stones of wool were imported into England, the quantity of yarn had diminished to 3,412 stones. As the home practice of combing and spinning became neglected, the price of wool fell; and the manufacturers of Dublin, Cork, Waterford, and other places were enabled to make advantageous purchases, and extend their manufacturing operations.

Thus then it would appear, that from whatever source originally derived, the hills and valleys of Ireland, from the olden time to our own days, have afforded support to numerous flocks of sheep, noted for the goodness of their wool. In times not very remote, and long after the wolf was extirpated in England, this savage beast was common in Ireland, and it was usual to build stone enclosures for the protection of the flocks at night, which however were not always impregnable. It was to defend the flocks against this powerful animal that the ancient Irish wolf-dog, now almost if not quite extinct, was so carefully preserved. This dog was a gigantic species of rough greyhound, acute in the senses of hearing, sight, and smell, and endowed with extraordinary courage, power,

and lacerating gripe of jaw; the Highland deer hound is a smaller and lighter branch of the same stock. We learn that it was not until towards the middle of the eighteenth century that the wolf was finally extirpated in Ireland. In the year 1710 there was a reward for killing wolves granted in Cork; and even as late as 1730-40, wolves were killed in the county of Wexford.—(See *Irish Penny Journal*, May 8, 1841).

The wolf is now destroyed, but in many parts of Ireland at the present day considerable havoc is made among young lambs by eagles and foxes; the breeding ewes wander over the hills, often quite neglected, nor is any adequate provision made for them in winter, although the valleys and sides of the hills invite the introduction of turnip husbandry, and the cultivation of the artificial grasses.

It is almost impossible to say what the characters of the ancient Irish sheep were; it would appear however that two breeds, each having perhaps several varieties, divided the island between them: one was a short-woolled race, the other was long-woolled. The short-woolled race was peculiar more especially to the mountains, as those for example of Galway and Connemara, where it is termed the Cottagh sheep; this breed still survives, and is kept pure on the mountains in many districts; it is a sheep admirably adapted to its own ancient territory. The head is small, short, and round; the ears are upright; the neck is long, and the general contour rather slender, but still admirable; the limbs are small boned and clean, denoting vigour and activity. The wool is variable, sometimes wavy, sometimes matted, and that on the tail and parts adjacent is coarse; the head is only covered with close hair. The fleece averages from two to three pounds, the fibre being about two inches in length. It is very useful in the manufacture of flannel, of which a great quantity is made, and sold chiefly at Rathdrum. In this ancient race there is manifestly an excellent ground-work for improvement, and that through the intermixture of the Southdowns. We may add that this source of improvement has not been overlooked; in fact the intermixture has been carried extensively into effect, with favourable results, not only as to the character of the sheep themselves, but also of their wool. It is an intermixture of cognate races. The Merino has been tried, but without success; the cold and humid hills being uncongenial with its temperament.

It was into Wicklow that the Southdowns were first introduced by the Farming Society of Ireland for the gratuitous use of the breeders. At first rams only were imported, but afterwards ewes, and some spirited cultivators encouraged the breeding of this stock. Premiums were offered by the society for the best piece of cloth manufactured from Irish Southdown wool; and in 1809 and 1810 Southdown wool, at the annual clothing

sale at Dublin, sold for enormous prices. In the former year, "some of Mr. Syme's Southdown wool sold at 7s. per pound; some belonging to Lord Claremont at 5s. 7d.; some belonging to the Marquis of Sligo at 5s. 3d.; and some of the fleeces of Mr. Wynne's flock at 3s. 6d." At the sale in the following year Lord Claremont's wool sold at 5s. 6d.; Mr. Grierson's at 5s. 7d.; Mr. Critchley's at 6s. 6d.; Mr. Wynne's at 6s. 7d.; Mr. Dudgey's at 7s.; Mr. Beresford's at 7s. 11d.; and Mr. Syme's at 8s. 5d."

It may readily be imagined that such prices, resulting from temporary competition and premiums (soon to cease), could not be long maintained; and, accordingly, no sooner had the competition among the buyers ceased, and the premiums become annulled, than the Southdown wool grown in Ireland found its ordinary level. There was no longer the necessity for such premiums; the Southdown breed was established, or supposed to be so. But in reality it was not thoroughly ingrafted into the soil; in the long run (we will not moot the causes) neither the pure Southdowns nor the half-bred Southdowns maintained their standing—not that the results of their introduction became obliterated (that is of the pure Southdowns)—but the breed did not ultimately meet with the encouragement it deserved, and consequently failed to produce all the good it might have done. It is true that both in Wicklow and elsewhere flocks of Southdowns are to be met with, but they are regarded generally with prejudice, and are thus not permitted to extend their ameliorating influence. But we hope for better things yet; for improvements in the system of farming, in the management of crops, in drainage, in manuring, and the production of a regular supply of the produce of the earth for man and cattle; for with these comes, *pari passu*, the improvement of live stock of every description.

With respect to the Irish long-woolled sheep they were formerly ill-shaped animals and slow feeders, but they scarcely deserved the censure of Mr. Culley, whose eye, accustomed to his own valuable breed, became over-sensitive when points of inferiority were brought under its scrutinizing glance. It was at the great fair of Ballinasloe, where 95,000 were exhibited before him, apparently to his horror, if we are to judge by the strength of his expressions, which are always given with straightforward honesty. "I am sorry," he writes, "to say I never saw such ugly ill-formed sheep as these; the worst breeds we have in Great Britain are by much superior. One would almost imagine that the sheep-breeders in Ireland have taken as much pains to breed plain awkward sheep as many of the people in England have to breed handsome ones. I know nothing to recommend them except their size, which might please some

old-fashioned breeders who can get no kind of stock large enough. But I will endeavour to describe them, and leave my readers to judge for themselves. These sheep are supported by very long, thick, crooked gray legs; their heads long and ugly, with large flagging ears, gray faces, and eyes sunk; necks long, and set on below the shoulders; breasts narrow and short, hollow before and behind the shoulders; flat-sided, with high narrow herring backs; hind-quarters drooping, and tail set low. In short, they were almost in every respect contrary to what I apprehend a well-formed sheep should be; and it is to be lamented that more attention has not been paid to the breeding of useful stock in an island so fruitful in pasturage as Ireland." However, he proceeds to give to the "Mr. Frenches, and some other spirited breeders," great credit for their exertions, and the crosses they effected, not without expense and hazard, for at that time there was a law in full force against exporting sheep into Ireland, as into France, or to any of our so-called *natural* enemies on the continent. As we have said before, we will not enter into politics, only this we may say, what means of improvement had the Irish farmer under such a stringent law? Happily it is abolished, and what is more, and in what Mr. Culley would have rejoiced, his favourite and beautiful Dishley sheep were destined to effect the most extensive reformation. At first, as might be expected, this breed was opposed; it had to contend with prejudices (what instrument of reform and general benefit has not?) but, as it had done before, it triumphed over all difficulties, and became of acknowledged importance. The results which we have already detailed occurred on this new theatre; we need not repeat them—our reader knows them. In short, Ireland began to show an improved breed equal to that of the midland counties themselves. A new impetus was given to the breeding of long-woolled stock, and in proportion as this stock spread, the short-woolled sheep were more confined in their range, perhaps more neglected, and ceased to be regarded as valuable; their wool was not in request, it could not compete with the Saxon-merino; but the wool of the other race soon equalled that of the best Leicesters, nor, as regarded fattening and early maturity, were these sheep in the background. Ireland can now send to the English markets as good sheep as the midland counties can produce.

We shall not attempt to enumerate the names of the enterprising breeders who, with property at command, exerted themselves in producing this change; neither shall we describe the minuter modifications which the sheep of the various counties present, since the differences are rather in degree than in anything essential. As elsewhere, the Dishley has triumphed in Ireland; and Mr.

Culley, could he now revisit Ballinasloe fair, would rejoice to give a far different report.

A great quantity of Irish wool is sent to the English market—it is very useful for the manufacture of stuffs, bombazines, &c.; while at the same time England sends back in turn Southdown wool, to work into some of the finer goods manufactured in Ireland.

But there is another and even more important point in which the Irish sheep farmer can compete with the English, even on English ground; that is in the carcasses of the sheep themselves, ripe and ready for the butcher. Thanks to Mr. Bakewell's cross, he can get them into condition at little more than two years old, instead of having, as formerly, to feed for four years and upwards; and as steam vessels export his stock rapidly, cheaply, and with certainty, and there are such markets as Liverpool, Bristol, &c., he is at no difficulty as to their disposal. We cannot ascertain the number of sheep within the last few years imported from Ireland into England, but in 1811 the number was 26,029; while in 1831 Liverpool received 134,762. It is now common to transport the carcasses only, the animals having been killed and properly packed for a few hours' journey per sea to Liverpool; but great numbers of lambs, averaging 20,000, are annually sent alive and in good condition.

When we consider the vast amount of animal food, cattle, sheep, and swine imported from Ireland into England, knowing as we do the general condition of the Irish peasantry (we speak not of a recent providential visitation, in which Europe generally has participated), we feel some degree of surprise. It would seem as if the island was overstocked, or sent all her animal food away. Neither is the truth. The meat-eating population of Ireland is far less than in England, numbers being compared with equal numbers. The mass of what is termed the middle class is not comparatively so great by many degrees, and moreover is somewhat different in habits from the same class in England. In the meantime agriculture, especially in some districts, has recently made great progress, and turnip husbandry been on the increase. The substantial farmers have been enabled to raise more stock, and to bring that stock not only earlier but in a better condition than previously into the market, while the amount of home consumption remained nearly *statu quo*, since the peasantry still regarded potatoes as their staple diet, and thought of no other animal food than pork, or the flesh of the swine they themselves reared. It is easy to see how on such a system a whole race, on the failure of the potato crop, must suffer. How could a pig ever be kept, nay a fowl, when that on which they depended for themselves and their pig was cut off? What though the land was replete

with flocks and herds, these were destined for the best markets where they fetched the most remunerating price; and what price could an impoverished peasantry offer even in the home-markets of the towns to which they might have access? If the farmer is not remunerated he is

ruined, and that would be adding confusion to confusion.

The following table of the numbers of cattle and the quantity of some other produce exported from Ireland in the years 1825 and 1835, may be not uninteresting by way of showing the increase:—

DESCRIPTION.	Numbers and Quality.		Increase between these periods.	Estimated value for 1835.	
	1825	1835		£	s.
Cows and Oxen - - - - -	63,524	98,150	34,626	793,837	0
Horses - - - - -	3,150	4,655	1,515	65,453	0
Sheep - - - - -	72,191	125,452	53,261	199,986	0
Swine - - - - -	65,919	376,191	310,272	893,839	0
Provisions—Bacon and Hams - - - - -	362,278	379,111	16,833	828,158	0
„ Beef and Pork - - - - -	604,253	370,172	decrease	729,935	0
„ Butter - - - - -	474,161	827,009	352,848	3,316,306	0
„ Lard - - - - -	35,261	70,267	35,000	182,013	0
Hides and Calf skins - - - - -	— ?	57,657	— ?	45,831	0
Wool of Sheep and Lambs - - - - -	— ?	33	— ?	1,240	0
Ditto ditto - - - - -	— ?	764,184	— ?	17,322	16

With regard to the modes upon which the sheep are managed in the several districts of Ireland, there is, as may be supposed, much difference. In some parts, as Louth and Monaghan, the land is chiefly devoted to tillage, and cattle and sheep are neglected. In other places old and bad habits still prevail; but in some counties the improvement in the breeds of the sheep has been accompanied by the gradual improvement in sheep husbandry altogether; and the description given by Mr. Parkinson of the modes pursued in washing, shearing, &c., we would hope will no longer be found to hold good. Still there is room for further alterations, and for the general adoption of a good system, and the practice of folding according to the quality and nature of the pasturage. Mr. Parkinson held a farm at Slane, county of Meath, but he could not succeed in his undertaking, and no wonder. He had to contend against habits and practices that must have not only tried his patience but his purse also. He thus describes the modes of sheep-washing and clipping, which with despair he beheld practised on his own flock without the means of helping himself:—“At the proper season (for washing) they told me they had the best method and the most convenient place possible; but when I came to see the place and understood their mode of proceeding, I deemed them both to be the worst possible. The sheep were taken to the side of the river Boyne, where four or five men were stationed to throw them into the water, and ten men to wash them, and there was a double set of these. One man took hold of the fore legs of the sheep and another of the hind legs, as soon as they could seize him in the water, and thus they tossed him to and fro several times in the water. The next two men then seized him and served him

in the same way, and so with the other six. There was evidently considerable danger of accident, besides a great deal of confusion. They drank four gallons of whisky among them, and they only washed half my sheep. In the evening I began to calculate my expense. The thirty people employed cost me 25s., the four gallons of whisky cost me 24s. more, and altogether it amounted to more than 2s. 6d. per score, whereas I used to have my sheep washed in England at 4d. per score. I resolved on the following day to save part of this expense, and I had a kind of fold made in the river, by which means I could proceed as expeditiously with half the number of men. The men were tractable to a certain extent, but contrary to common rule and common sense, they would wash the sheep down the stream instead of against it, so that the dirty water ran from the first man to the last. With a great deal of trouble I got the reduced number of men to wash the remainder of the sheep at an expense of about 1s. 6d. per score.

“In due time came the shearing. I was promised the best set of clippers in Ireland. They were to have 2s. 6d. per day each, and their victuals, which could not be calculated at less than 2s. 6d. more. This may seem a very extravagant calculation, but the men were unaccustomed to such living, and they ate so immoderately that without one saw it one would hardly have believed it. I never supposed but that these men would clip twenty sheep a-day at least, but the day's work proved it to be but thirteen each; so that the whole expense in washing and clipping was 10s. 8d. per score. I could have had it done in England much better for 3s. 4d. per score.

“Beside all this, these Irish clippers do not

clip round the sheep as the clippers do in England, but they clip short strokes, catching a bit of wool from one place and a bit from another. If they are not narrowly looked after they will leave many parts untouched, such as the head and legs and the inside of the thighs and tail. But every kind of rural work in Ireland is done in a similar manner."—*Parkinson's Practice of English Agriculture in Ireland.*

Checked though it may be by events over which man has no control, and by causes which it is not our place now to moot, the prosperity of Ireland, possessing as she does so many sources of wealth within her own shores, must sooner or later commence in earnest; and whatever direction her commerce may take, husbandry, agriculture, the rearing of flocks and herds, will ever be most important. Let us take the modern improvements of her long-woolled sheep as a propitious omen. To see what good in this department of the farmer's business has been effected we should visit Ballinasloe fair. In describing this we must borrow the words of a writer whose account is condensed from a series of statements in the *British Farmer's Magazine* (vol. viii., p. 565).

"Ballinasloe fair, the Falkirk Tryst of Ireland, is held at the latter end of October. It is the mart of all the sheep-breeding and grazing districts. From 60,000 to 80,000 sheep are generally exhibited, and sometimes very near 100,000, and more than four-fifths of them are usually sold. Between 30,000 and 40,000 cattle are driven to Ballinasloe for sale.

"Ballinasloe is the place for the traveller to resort to in order to convince himself of the true character of the Irish long-woolled sheep. So improved have they become by the first intermixture of the Dishley blood, by the continued importation of Leicester rams, and by the judicious selections of males of Irish growth, that no one would recognise a single trace of the uncouth worthless animal which Culley depicted.

"It is pleasing to see the orderly manner in which, during the time of business, the whole is conducted. The ewes and wethers are shown in separate parcels; the ewes in lots of from 100 to 300 or 400, and the wethers in lots of from 200 to 500 or 600, the ewes having a red mark across the loins, and the wethers being without any mark. The different lots stand within a few yards of each other, leaving just room enough to admit of the purchasers walking round in order to inspect the flock.

"Each lot is surrounded by a number of shepherds, in the employ of the owners of the sheep; they are all dressed in dark brown coarse woollen cloth. These are Connaught men, and the greater proportion of the sheep belong to Connaught. Every one has his crook, in the use of which he is

exceedingly expert. There is another lot of men dressed in the same kind of cloth, but of a gray or frieze colour; these are Leinster men, the shepherds of the intended buyers. There has from time immemorial been a feud between the Leinster and Connaught men, and this leads to many a rude jest or sarcastic remark, but there is no breach of the peace until the fair is over. No shepherd's dog is permitted in the whole fair. At the fair of 1834 80,000 sheep were shown, of which more than 70,000 were sold, and their value, at 34s. per head, was nearly £120,000. In 1836 only 61,094 were shown, of which 53,214 were sold. The average price of wethers was from 45s. to 55s., that of ewes was from 35s. to 45s., and of hoggets from 30s. to 38s.

"The business of the fair being terminated, another act commences. The love of whisky and the love of fighting are, by a kind of prescriptive right, permitted to display themselves in all their glory; and the play terminates with the customary number of broken heads and other contusions."

The last paragraph grates upon our feelings. Many are the English fairs at which we have been present, and though we have witnessed an occasional quarrel—personal, not feudal—and also scenes resembling that depicted by Wilkie, now in the National Gallery (*The Drunken Farmer*), still no savage fighting, under the excitement of an immoderate quantity of ardent spirits, was the established order of the day. The following passage does not give us a better picture of the state of things:—"Ballinasloe summer fair used to be the principal and almost the only wool-mart in Ireland; and strange scenes were there exhibited in full keeping with Irish propensities and character. The meeting in July seemed to be more devoted to the purposes of conviviality and the endeavour to overreach each other, than the honest sale and purchase of wool. The buyers and the sellers loitered about the streets and inns of Ballinasloe, disputing about a few pence in the price of a stone of wool day after day, and almost week after week, spending ten times more than the sum which the one would have paid or the other received. Sometimes a party of them would start away for some distant place of amusement or resort, and not return to the fair during many days, hoping to find their antagonists completely wearied, and ready to agree to any bargain. The bad habits too natural to the Irishman were indulged in without restraint, and the foundation for neglect of business, intemperance, and eventual ruin, was often laid at Ballinasloe fair. The wool is now disposed of in a more orderly way, in the principal towns of the respective counties, or it is sent to the wool-mart, at Dublin."—(See *Dutton's Survey of Clare*, and *Wakefield's Account of Ireland*.)

CHAPTER IX

SUPPLY OF LONDON.—WOOLLEN MANUFACTURES.

BUT we must return from Ireland, to whose husbandry and commerce (and the two cannot be disjoined) we wish all good success.

There are two points connected with our subject which demand a brief notice; we allude to the supply of our great metropolis with sheep for the markets, and to the origin of our woollen manufactures.

With respect to the supply of sheep to our metropolis, so many alterations within the last few years have been effected by the railroad and the steam vessel, that the work of the patient drover is rendered almost a nullity. From every part, trains laden with live stock traverse the country, little noticed, save at the stations on the iron road, or at the spots of their embarkment, if we may be allowed the expression, and at the termination of their journey. It is thus that oxen, calves, and sheep are now conveyed to London, not, as we have recently seen, without occasionally meeting with accidents, which ought never to occur, inasmuch as they are not connected with the principles upon which the whole machinery of the railroad is established, but result from extrinsic causes. From Ireland, from Devonshire, from Scotland, from northern and midland England, and from our south-eastern counties, the country transmits to London, by the medium of the railroad and steam vessels, her stores of horned and of woolled stock. We here say nothing of the country-killed meat received at Newgate and Leadenhall, and sent up per railroad, and which naturally varies in quantity according to the season of the year. Once the idea of sending from any great distance the carcasses of oxen or sheep to London, would have been deemed visionary; but the railroad, at no distant date treated as a vain project, has altered the condition of affairs, and equalized the productions of the country, at least to a great degree, and is in further progress.

Pope, taking a survey of the equalization of the productions of the world at large by means of our fleets, or rather perhaps of the advantages enjoyed by a great maritime nation, said,

"Let India boast her plants, nor envy we
The weeping amber or the balmy tree,
While by our oaks the precious loads are borne,
And realms commanded which those trees adorn."

WINDSOR FOREST.

What would he have said had he lived to see the power of steam applied to "our oaks"—to behold steam-impelled waggons ready to receive their freight, and travelling on iron train-lines, distribu-

ting it, within a few hours after its reception, throughout the heart of our island!

"The steamship, the swift ship, the plougher of waves,
The stemmer of billows against the strong wind!
The wave-cutting ship, which the tidal force braves,
And leaves the slow brig on the dark blue behind!"

MS. ANON.

With respect to foreign importation of sheep, and we may add cattle in general, they have been lately on the increase, but London absorbs them as in a vast vortex. The English stock feeder has no occasion to alarm himself; let the commerce of our island flourish, and the farmer need not doubt of a rapid sale of all his agrarian produce, grain and cattle—yes, and of far more than he can bring into the market.

As an index of the state of the London markets, both as regards home-fed stock and imported stock, at an unfavourable season of the year, when butchers' meat is in less demand than in winter, and when country-killed carcasses are restricted in number we take the following extracts from a leading journal:—

MONDAY, JULY 5, 1847.

SMITHFIELD.

The following importations of live stock have taken place in London during the past week:—

From whence.	Oxen.	Sheep.	Lambs.	Calves.	Pigs.
Flushing	—	451	..	..	..
Rotterdam	383	1,298	..	39	134
Antwerp	18	—	..	—	—
Hamburgh	172	398	..	..	..
Harlingen	100	186	4	22	2
Nieu Diep	20	260	4	20	—
Total	693	2,603	47	176	2

In addition to the above about 380 beasts, 700 sheep and lambs, and 40 calves, have been landed at Hull and the other northern ports, mostly from Holland. The supply of foreign stock on offer to-day was very extensive, viz. 384 oxen and cows, 3,492 sheep and lambs, and 29 calves, nearly the whole of which found buyers, at fully last week's quotations. For the time of year the arrivals of beasts from our own grazing districts were tolerably good. Although there were several well made-up droves on sale, the general quality of this description of stock was by no means prime; and the butchers complain, not without cause, that the beasts "die" badly. Notwithstanding the weather was unfavourable to slaughtering, the beef trade, owing to the increased attendance of both town and country buyers, was steady, at prices fully equal to, but at nothing quotable beyond those obtained on this day se'nnight. The primest Scots were disposed of at from 5s. to 5s. 2d. per 8 lbs. The arrivals of beasts from Norfolk, Suffolk, Essex, and Cambridgeshire, consisted of about 900 Scots, home-breds, and short-horns; from the western and midland districts, 800 Herefords, runts, Devons, &c.; from other parts of England, 700 of various breeds; and from Scotland, 320 horned and polled Scots. Compared with those exhibited on Monday last the numbers of sheep were small, but of full average quality. On the whole there was

an improvement in the mutton trade, and in some few instances the primest old Downs sold at 5s. 6d. per 8 lbs., being an improvement in value of 2d. per 8 lbs., while the value of most other breeds—a clearance of which was effected prior to the close of the market—had an upward tendency. There was a fair supply of lambs on show; yet the trade was firm at last week's currencies. The highest value of the best Down qualities was 6s. per 8 lbs. Calves, the numbers of which were but moderate, moved off slowly, at about stationary prices. In pigs next to nothing was doing, at late rates.

Per 8 lbs. to sink the offal.

s. d. to s. d.	s. d. to s. d.
Inferior beasts 3 10 4 2	Second quality ditto 4 6 4 8
Second quality..... 4 4 4 6	Coarse woolled do. 4 10 5 2
Prime large oxen..... 4 8 4 10	Southdown wether 5 4 5 6
Prime Scots..... 5 0 5 2	Ditto out of the wool — —
Large coarse calves 4 0 4 6	Large hogs 4 0 4 6
Prime small ditto 4 8 5 0	Small porkers 4 8 5 0
Suckling calves... 18 0 29 0	Quarter old pigs... 17 0 22 0
Inferior sheep..... 4 2 4 4	Lambs 5 0 6 0

SUPPLY AT MARKET.

Beasts.	Sheep.	Calves.	Pigs.
2,882	23,740	222	248

NEWGATE AND LEADENHALL.

Considering the time of year, the arrivals of country-killed meat up to these markets since Monday last have been tolerably good, though of inferior quality. The supplies slaughtered in the metropolis have been small. Prime beef, mutton, and veal have moved off steadily; all other kinds of meat slowly; and the general quotations must be considered a trifle beneath those obtained last week, owing to the caution with which the butchers have made their purchases. Nearly 1,100 carcasses of foreign meat, killed in London, have been on show.

At per stone by the Carcase.

s. d. s. d.	s. d. s. d.
Beef, inferior 3 6 3 8	Mutton, inferior.. 3 10 4 2
— middling..... 3 0 4 0	— middling. 4 4 4 8
— prime large.. 4 2 4 4	— prime..... 4 10 5 0
— prime small.. 4 4 4 6	Pork, large 3 10 4 10
Veal 3 10 4 10	— small 4 8 4 10

Lamb, 4s. 10d. to 5s. 10d.

MONDAY, JULY 12, 1847.

SMITHFIELD.

The following imports of live stock took place into London last week:—

From whence.	Oxen.	Sheep.	Lambs.	Calves.
Harlingen.....	157	376	3	127
Hamburgh.....	89	228	—	12
Spain.....	4	—	—	2
Nieu Diep.....	67	98	15	59
Rotterdam.....	573	1,419	38	113
Total.....	890	2,121	58	313

At the outports the arrivals have been very large, viz. about 400 head of beasts, 1,500 sheep and lambs, and 120 pigs, chiefly from Holland, with a few from Spain, and which have been mostly disposed of at full prices. The supply of foreign stock here this morning comprised 5 oxen from Spain, 60 ditto from Prussia, 20 ditto from Germany, and 300 oxen and cows, 1,649 sheep and lambs, and 21 calves from Holland. Generally speaking, its quality was inferior, and much difficulty was experienced in effecting a clearance, notwithstanding the salesmen submitted to lower terms. There was, compared with that exhibited on Monday last, a considerable increase in the number of home-fed on sale, owing to which, and the prevailing hot weather, the beef trade was in a very inactive state, at a decline in the quotations obtained on this day se'nnight of quite 2d. per 8 lbs. The very highest figure for the best Scots was 5s., but the more general currency for the first quality of beef did not exceed 4s. 10d. per 8 lbs. There were some extremely well made up beasts on offer; yet the total supply was by no means first rate, and several complaints have

reached us of the mode in which this description of stock dies. From Norfolk, Suffolk, Essex, and Cambridgeshire, we received 900 Scots, home-breds, and short horns; from the western and midland districts, 920 Herefords, runts, Devons, &c.; from other parts of England, 800 of various breeds; and from Scotland, 220 horned and polled Scots. The numbers of sheep were considerably on the increase; hence the mutton trade was extremely depressed, and the currencies declined from 2d. to, in some instances, 4d. per 8 lbs. A few very superior old Downs might have produced 5s. 4d., but our highest general quotation was 5s. 2d. per 8 lbs., and at which a total clearance was not effected. With lambs we were well supplied. All kinds met a very dull inquiry at a reduction in value of 2d. per 8 lbs., the extreme range of value of the best Down qualities not exceeding 6s. per 8 lbs. The sale for calves, the supply of which was small, ruled heavy at last week's figures. Pigs moved off slowly, but prices were mostly supported.

Per 8 lbs. to sink the offal.

s. d. s. d.	s. d. s. d.
Inferior beasts 3 8 4 0	Second quality ditto 4 4 4 9
Second quality.... 4 2 4 4	Coarse-woolled do. 4 8 4 10
Prime large oxen .. 4 6 4 8	Southdown wether 5 0 5 2
Prime Scots..... 4 10 5 0	Do. out of the wool — —
Large coarse calves 4 0 4 6	Large hogs 4 0 4 6
Prime small ditto.. 4 8 5 0	Small porkers 4 8 5 0
Suckling calves . 18 0 28 0	Quarter old pigs .. 16 8 21 0
Inferior sheep 4 0 4 2	Lambs 5 0 6 0

SUPPLY AT MARKET.

Beasts.	Sheep.	Calves.	Pigs.
3,243	29,220	273	250

NEWGATE AND LEADENHALL.

Owing to the prevailing hot weather, scarcely any slaughtered meat has come to hand from distant quarters since this day se'nnight. The supplies on offer killed in the metropolis have been very small; yet, from the before-mentioned cause, the general demand has been in a sluggish state, and in some instances the quotations, especially those of the inferior qualities, have had a downward tendency. Several packages of beef have come to hand from Hamburgh in very middling condition, while about 2,000 carcasses of foreign meat have sold at late rates.

At per stone by the Carcase.

s. d. s. d.	s. d. s. d.
Beef, inferior 3 6 3 8	Mutton, inferior... 3 10 4 2
— middling..... 3 8 3 10	— middling. 4 4 4 10
— prime large.. 3 10 4 2	— prime..... 6 0 5 2
— prime small.. 4 2 4 4	Pork, large 3 10 4 6
Veal..... 3 10 4 10	— small 4 8 4 10

Lambs, 4s. 10d. to 6s.

Let us now glance at our woollen manufactures, not with a view of attempting to enter into practical details, but with the design of giving a sketch of their general progress, a point of some interest, and not unconnected with the earliest history of our island.

It is a remarkable circumstance that Julius Cæsar, although he noticed horned cattle, the horse, the fowl, and the goose, among the domestic animals of Britain, and describes the use of skins by the natives as scanty clothing and a covering for their hovels, says nothing respecting sheep or wool. It is true that he gained only a partial acquaintance with this island, but still it was with such parts of it (the downs for example) as then fed sheep, granting the island to have been stored with these animals—and that sheep existed here on the arrival of the Roman conqueror, there is no reason to doubt. The neighbouring Gauls, with whom the Britons had long maintained an intercourse, not only possessed

sheep, but felted their fleece into a sword-proof tissue. The silence of Cæsar can only then be considered as accidental. Perhaps indeed he took it for granted that where the horse and the ox were possessed, setting aside the fowl of Indian origin, the natural conclusion would be that the sheep was not wanting. Perhaps he never gave the animal more than a passing thought. From the time of Julius Cæsar's return to Italy (and death), although Augustus demanded tribute, and received presents and hollow promises of fidelity from the Britons, the island was neglected by the Romans till the time of Claudius, who in A.D. 43 sent Plautius with an army in order to subjugate the natives. But this was not effected until after a lapse of many years, during which time an incessant warfare was maintained. Julius Agricola entered Britain as governor towards the end of the reign of Vespasian (A.D. 78). In the course of six or seven years Britain became truly a part of the Roman empire, and so continued until the final departure of the remains of the Roman army, A.D. 426; Honorius having renounced the sovereignty of the island in A.D. 410. During the dominion of the Romans Britain rose in civilization, and in all the arts of social life, and, as we have already said, became celebrated for the manufacture of fine woollen fabrics, which were imported into Rome, and highly valued for their exquisite delicacy. One of these manufactories was established at Winchester (Venta Belgarum), placed in a district occupied by Belgæ, not British. We cannot for a moment suppose that the wool used there was imported—it was undoubtedly the produce of native sheep, and as Winchester is in the heart of a district fitted only for the rearing of a short-woolled race, we may presume that it was *short wool* which was employed. Some, however, are of a contrary opinion, and found it upon an expression of Dionysius Alexandrinus, viz., "The wool of Britain is often spun so fine that it is in a manner comparable to the spider's thread;" and they observe that "as old usages are not often forgotten, and old established manufactories do not often change their fabric, there are still many factories of fine worsted in the immediate neighbourhood of Winchester that can scarcely be excelled in the kingdom." Mr. Youatt adheres to the former theory. "Short wool," he says, "was the only material that could be procured without difficulty there, or that could be procured at all. It was the short wool that was used in this first manufactory, and the art of fulling not being carried to the perfection to which it now is, the threads were plainly seen, and their comparative fineness could be ascertained. It may be added, that manufactories of short woollen goods have been established there from time immemorial, and that

the first *guild* of fullers were chartered at Winchester."

We leave the question undecided, though we incline to the side of those who contend for the short wool. After the retreat of the Romans Britain became a scene of confusion, till at length its original inhabitants, retreating before the tide of Anglo-Saxon invaders, took refuge in the fastnesses of Wales, the wilds of Cornwall, and the mountain ranges of the more northern parts of Scotland.*

The Saxons were in their turn harassed by the Danes, and it is only reasonable to imagine that until the times became settled the manufactories for woollen fabrics and cloths would become more or less deserted, and the art of manufacturing fall into comparative decay. The Anglo-Saxons, however, reared sheep in great numbers, but their wool was spun and manufactured at home. Spinning was the ordinary employment of the females of every household, from the monarch's to the peasant's. We must not however suppose the cloth produced to have merited the commendations given to the fine British fabric of the Roman period. It was coarse, and no doubt strong and serviceable, but as regards the woollen manufacture as a branch of national commerce, we have no grounds for supposing that it had regained its former prosperity; not that it was extinguished—it languished, and was destined to revive and flourish. What check it received upon the Norman conquest, and in consequence of the outrages of the lawless barons whom the love of plunder induced to accompany or follow William the Conqueror, we cannot tell; certain however it is that it speedily began to flourish and assume its due importance, inasmuch that in the fifth year of the reign of Stephen the manufacturers of many of the principal towns petitioned for the privilege of forming themselves into exclusive corporate bodies called *Guilds*, to be governed by such systems of rules or laws as they should deem best for their own interests and the promotion of their peculiar trade. Among these petitioners

* It is evident that besides the Celtic race or Cymri, a nation of Gothic extraction, viz., the Belgæ, occupied the south-eastern and most fertile provinces of Britain—even antecedent to the arrival of Julius Cæsar. These Belgæ appear to have extended their possessions, and as they were a congenious race with the Saxons, and spoke a dialect of the same language, it is not improbable that they submitted to and mingled with the latter people, and that while the Celtic portion of the population was driven to the remoter parts of the island, the Belgæ remained occupants of their lands, and on a friendly footing with the Anglo-Saxon invaders. What renders this the more probable is the sudden prevalence of the Anglo-Saxon language, which we can hardly imagine to have taken place had not a similar language (a dialect) been already in extensive use; for surely the number of invaders was not so great as to people the island in so short a time as would appear to have been the case. Hengest and Horsa arrived in England in 449, and in 584 the Britons leave England and retire into the fastnesses of Wales. The country however had long previously received a race of Gothic extraction,—a people who did not speak the language of the Cymri.

were the wool weavers of Winchester, who paid one mark of gold (about £30 of present money), to have their customs and privileges, with right to elect the aldermen of their guild. Another body consisted of the fullers of Winchester, who also were elected into a separate guild, on the annual payment of sixteen marks (or of our money upwards of £480). Here we see that the Winchester manufactures, established under the Roman dynasty, still survived through all changes, and reasserted their ancient importance. We find moreover that the short wool was the material used at Winchester, for long wool is not a fulling wool, and broad-cloth, which requires short wool and the fuller's milling process, was the article fabricated.

It was not however to Winchester that the woollen manufacture was restricted. The weavers of Oxford had their guild, for which they paid a mark of gold, and the weavers of London, who paid £16.

The dyers of Worcester, who appear to have lost their privileges, agree to pay 100 shillings (about £50 of our money) in order that they might buy and re-sell wool as they had been accustomed to do in the reign of Stephen's predecessor on the throne, Henry I. It would thus then appear that the dyers, the weavers, and the fullers constituted in their respective towns distinct corporate bodies, subject as far as their "craft and mystery" were concerned to their own laws. Such a circumstance, connected with the number of departments into which the woollen manufacture was divided, proves at once its flourishing condition and its importance.

It would appear that even at this early period Spanish wool began to be imported into England; for in the next reign, that of Henry II., a statute was ordained in 1172 prohibiting the mixture of it with English wool in the manufacture of broad-cloth, doubtless on the grounds that the interests of the English wool-grower would be sacrificed were the manufacturer at liberty in this respect. There is also reason to believe that in very early times the fine short wool of England was unexceeded in the delicacy of its staple and in the goodness of the cloth which in skilful hands might be prepared from it. That this prohibition did not altogether hinder the use of Spanish wool is plain from the fact that in 1186 a more stringent law was made, by which it was enforced that all cloth of British manufacture, which should consist either wholly or in part of Spanish wool, should be burned in the presence of the mayor of London.

The true value of the sheep as a wool-bearing animal was now fully appreciated; the lands, especially around the religious houses, abbeys, and monasteries, were cleared and cultivated, and though large woodland tracts still remained, the wolf no longer haunted them or made them a

retreat, or issued from them to ravage the flocks. These latter were now extremely abundant, and what is more, their wool was in request abroad and gladly received into the markets. A singular circumstance corroborates these observations. In the year 1194 a vast sum of money was demanded by the Emperor of Germany for the liberation of Richard Cœur de Lion; already was England impoverished by the drainage of the greater part of the coin from the kingdom for the expenses of the crusade against Saladin, and what remained was insufficient, even when the plate borrowed from the churches was added to it. It was therefore found necessary to have recourse to some other source of wealth, and wool was the article selected; one year's product in wool was taken or borrowed from the abbeys of the Cistercians, and also from the religious houses of the order of Sempringham, and thus the hundred and fifty thousand marks were raised. Here then we have a proof of the estimation in which the English wool was held on the continent, and besides, have some reason to conclude that it was extensively grown by the religious houses and abbeys (the pioneers in all improvements of husbandry) as a source of revenue not of the lowest consideration. But there are other and earlier proofs of the value attached to this article; we allude to the laws forbidding its exportation. These laws we cannot doubt were continually evaded; and that they were so the occasional seizures of wool sufficiently attests, to say nothing of the sums demanded for leave to export this commodity. In 1128 the Chamberlain of London accounted for £23 12s. (or £472 of present money), being the payments or fines of certain merchants for leave to export wool and leather; and in the same year a cargo of wool belonging to William de Boulogne, which was attempted to be exported without license, was declared forfeited and sold, producing £20 (or £400 of present money). There was also a large seizure made at Hull in the year 1128, and the penalty was estimated at five silver marks (13s. 4d. the mark) per sack of 364 lbs., which in present money would make each pound of wool worth nearly 3s. 6d. "In the following year another parcel was seized at the same port; the owner not choosing to pay the estimated value, it was sold by public auction at 2½d. (3s. 9d. present value) per pound."

These and similar instances prove not only the value but the abundance of the wool grown in England even at this early date, and we have already alluded to the rising prosperity of the woollen manufactures in the time of Stephen. This prosperity continued, according to Sir Matthew Hale, through the reigns of Henry II. and Richard I.; but during the subsequent reigns of John, Henry III., and also of Edward I. and

Edward II., became greatly reduced, so that all our trade ran in wool, woollens, and leather. From this we learn that not only wool, but that manufactured goods were exported for the continent, and that the exportation of the latter gradually decreased; not however that the manufactures had ceased, for many facts prove the contrary, hence the expression of Sir Matthew Hale, "this manufacture was wholly lost," bears more particularly on manufactures for export goods, for he couples it with the following expression, "and all our trades (foreign exports) ran in wools, and woollens, and leather."

It must not be supposed that the woollen manufacture in different parts of the continent was neglected; it was assiduously cultivated by the Flemings, and our best wool, as it began to be less required at home, was exported to the Flanders markets, and returned to us in fabrics of fine texture. The Flemings were not growers of wool, and when the prohibition on the export of our wool was removed, large quantities were sent to Flanders at a fixed duty.

In the reign of Henry II. the importation of fine cloths was permitted at a fixed duty, which, with that paid upon the exported wool, formed a source of considerable revenue. The woollen trade now rapidly decayed; the impoverished artificers could not compete with the Flemings, who could, even after paying dues, bring into the markets a better and a cheaper article. At one time indeed the king, on the representations of the manufacturers, closed the ports against the exportation of wool; but the interdict, which affected the royal revenue in no small degree, was soon removed, and the ports were again thrown open and duties paid as before.

Thus, with unimportant alterations, depending upon political causes, upon the drainage of the kingdom of men and money for war, and the needs of the king, the condition of the woollen trade continued, till in the reign of Edward III. it once more revived. It has been by some supposed that the first establishment of the woollen manufacture in England is due to that monarch, but this is not the fact; it is however not the less credit to him that he restored it to activity. He was a monarch of great sagacity, no less than of ambition; and though engaged in long and heavy wars with Scotland and France, still he had the commercial interests of England at heart, and was not slow to perceive the importance of giving impulse to her manufactures, and the extension of commercial enterprise. "He had (says Mr. McCulloch) a clear perception of the advantages arising from the immigration of foreigners, as well by communicating a knowledge of the arts practised abroad, as in exciting a spirit of emulation and invention amongst the native population. Acting on this

principle, Edward availed himself, in 1331, of some discontents existing among the Flemish manufacturers to invite them over to England.* This invitation was accepted by a number of weavers, dyers, fullers, &c., who settled in different parts of the country, being protected by the vigorous policy of the king from the assaults of the rabble. From this early period down to the present day the manufacture has always been regarded as of primary importance. In 1337 an act was passed prohibiting the wear of any cloths made beyond seas; and it is supposed that the exportation of English wool was then also interdicted, but the words of the act do not bear this interpretation, the exportation being only '*till it be otherwise ordered*,' that is till measures were matured for subjecting it to a duty. In these unsettled and turbulent times prohibitory acts were but little attended to, and the one now referred to was soon after repealed. During the reign of Edward III., and for a long time after, the duties on exported wool formed a large branch of the revenue; and though the manufacturers were exceedingly anxious to have its exportation prohibited, and this was then believed to be good policy, they did not succeed in their object till 1660; when, owing to the increase of industry and commerce, means were found for raising a sufficient revenue, independently of the wool duties." The advantages of free trade were not then appreciated. But what, in the year 1668, when we succeeded in producing very fine cloth from Spanish wool, would the manufacturer have said if the importation of that wool had been prohibited? As it was, the prohibition of the exportation of English wool tended not to the benefit of the manufacturers; it occasioned a diminution of the growth of wool, and led to extensive export smuggling.

In a curious book, entitled the *Golden Fleece*, published in 1599, the anonymous author describes the endeavours of Edward III. to make England a wool-manufacturing country, as well as a wool-growing country (not without a view to his own interest), in a style not destitute of amusing quaintness.

"The wools of England have ever been of great

* Edward III. and his queen, Philippa of Hainault, established a cloth manufactory at Norwich, in 1335, but the first steps towards this good work were commenced as early as the 3rd of July, 1331. "A letter, dated from Lincoln, is addressed to John Kempe, of Flanders, cloth weaver in wool, in which he is informed that if he will come to England with the servants and apprentices of his mystery, and with his goods and chattels, and with any dyers and fullers who may be inclined willingly to accompany him beyond seas, and exercise their mysteries in the kingdom of England, they shall have letters of protection and assistance in their settlement."—*Fadera*. "Probably the name of John Kempe is derived from comb, that instrument being used in his employment, and means John of the Comb, as the old English verb to comb, is to kempe. Kempe was the patriarch of the Norwich woollen manufacturers."—*Miss Strickland*. Philippa greatly interested herself in these manufactures, and often visited Norwich to watch their prosperity.

honour and reception abroad, as hath sufficiently been witnessed by the constant amity which for many hundred years hath been inviolably kept up between the kings of England and the dukes of Burgundy only for the benefit of the wool; whose subjects receiving the English wool at sixpence a-pound, returned it (through the manufacture of those industrious people) in cloth at ten shillings a-yard, to the great enriching of that state, both in revenue to their sovereign and in employment to their subjects, which occasioned the merchants of England to transport their whole families in no small numbers into Flanders, from whence they had constant trade to most parts of the world. And this intercourse of trade between Burgundy and England endured till Edward III. made his mighty conquests over France and Scotland; when, finding fortune more favourable in prospering his achievements than his allegiate subjects were able to maintain, he at once projected how to enrich his people, and to people his new-conquered dominions; and both these he designed to accomplish by means of his English commodity, wool; all which he effected, though not without great difficulties and oppositions, for he was not only to bring back his own subjects home, who were and had long been settled in those parts with their families, many of which had not so certain habitations in England as in Flanders, but he was also to invite clothiers over to convert his wools into clothing, and these were the subjects of another prince, or else the stoppage of the stream would choke the mill, and then not only would clothing be everywhere lost, but the materials resting upon his English subject's hands would soon ruin the whole gentry and yeomanry for want of vending their wools. Now to show how King Edward smoothed these rough and uneven passages, were too tedious to this short narrative, though otherwise in their contrivance they may be found to be ingenious, pleasing, and of great use.

"But this it must be granted, that King Edward was wise, as well as victorious; for upon a visitation made by himself to the Duke of Burgundy, during his residence there, he employed such able agents among the Flemish clothiers, (as barely upon his promises) he prevailed with great numbers of them to come into England soon after him, where he most royally performed those promises in giving not only the free denization to them, but he likewise invested them with privileges and immunities beyond those of his native subjects, which peculiarities their posterities enjoy to this day. But for the more sure establishment, and before these preparations came into effect, King Edward upon his return called a Parliament, and that in the beginning of his reign, where he so wrought with the Commons' House (who had not the least knowledge that the King had moulded the design) as after long debate (which all motions

in that house ought to undergo), it was presented to the Lords, and so to the King, who, among other *objections*, urged the loss which must necessarily befall his revenue, as well in respect of the outward subsidy of a noble upon each sack of wool which was to be transported, as upon the inward custom which the cloth paid upon return according to the rates then established. But these soon met with an expedient; for the cloth in time to come must needs yield a far greater custom upon that which was to pass into all parts of the world from England, than it could upon that small return which came only to the service of England; and therefore, for the wool which from that time forward was to be wrought in England, and of which *none in any sort*, without the king's especial licence, was to be transported, the parliament gave unto the king a subsidy of a noble upon a sack."

"Seventy families of Walloons were in the first year brought to England by the invitations and promises of Edward. He kept his royal word to all of them. The greater part were at first settled in Kent; but they were by degrees removed to different parts, and scattered over the whole face of England. They shifted their residence according to the facility with which they could obtain water and fuel, or the material on which they worked. *The greater number finally settled in Yorkshire, Gloucester, and the western counties.*"

It was in the year 1337, while Edward was making preparations for a war against Philip of France, that he entered into a treaty with the Flemings, who were apprehensive of being oppressed by Philip; and at that juncture the parliament was called for the purpose of settling the wool trade. This parliament was held about the middle of March, and it was enacted that no wool of English growth should be transported beyond sea, and that all cloth-workers should be received from whatever foreign parts they came, and be encouraged.—*Rymer's Fœd.*, iv. It was also enacted that none should wear any cloths made beyond sea, except the king, queen, and their children; also that none should wear foreign furs or silks, unless he was worth one hundred pounds of yearly rent. At this period Edward was in his twenty-fifth year. At this time then came the Flemings, and with them the prosperity of the woollen manufactures, insomuch that in 1354, Edward being pressed for money in order to carry on his war with France and Scotland, the parliament granted him a subsidy of fifty shillings upon every sack of wool sold in the kingdom* for six

* According to Wheeler, this tax was upon all exported wool; but surely the country could not afford the export of so enormous a quantity of wool yearly, independent of what it used for home consumption.—(See *Rapin Hist. Engl.*: *Edw. III.*, A.D. 1354.) Wheeler says it amounted to 100,000 sacks a-year, or 36,400,000 lbs.

years. This subsidy is said to have amounted to more than 360,000 marks (of silver?) yearly. We may easily conceive to what extent the flocks were multiplied, and of the activity prevalent through the manufactories. In time, however, the stores of wool, much as was used, began to accumulate, and the ports were again opened for its exportation, and great quantities were imported at a high price into Flanders, Brabant, &c. &c. Indeed, as we have said in a quotation from Mr. McCulloch, it does not appear that even in the year 1337 the exportation of wool was prohibited, excepting till measures were matured for subjecting it to a duty; in proportion, however, to the increase of the growth of wool, so would be that of its exportation. On this point there is some degree of confusion, nor does it appear at what precise time the ports for outward-bound wool were opened. Probably they were never truly closed. With respect to the exportation of manufactured goods, it would seem that in 1354 broad-cloths, to the number of 4,774½ pieces, of the value of 40s. each, and amounting to £9,549, and also various pieces of worsted goods of various kinds, valued at 16s. 8d. the piece, and amounting to £6,717 18s. 4d., were exported. On these the duty was £215 13s. 7d., and the whole amount of the value of the goods and the duty was £16,481 11s. 11d.

On the other hand, there was an importation of 1832 broad-cloths of the value of £6 each, and, with the duty, amounting to £11,083 12s., leaving a balance in favour of the imports of £5,397 19s. 11d. "But the whole commerce of the year left a balance in favour of the exports of £255,214 13s. 8d., or, computing the difference in the value of money and the expense of living, £3,825,220 5s.—a most extraordinary balance, and showing the frugality of the times, and the resources of the country." (See *Youatt*, and also *Misselden's Circle of Commerce*, p. 119.)

To trace the history and progress of the woollen manufactures from their starting point in the reign of Edward III., through all their phases to the present day, would be a long and toilsome labour, as wearisome to the reader as to the writer, and indeed, even if dates and figures were correct and authorities unimpeachable, such statistics would be of little interest either to the breeder of sheep, the wool-stapler, or the manufacturer, still less to the public in general. Let us come at once to more recent periods—as we pass along, however, we cannot but notice the statutes of Edward IV., framed for the express purpose of putting down machinery! and the statutes of Philip and Mary, prohibiting any *clothier* out of a borough, market town, or corporate town, from having more than *one loom*, and any weaver dwelling out a city from having more than *two looms*; and not only this, but the act prohibits the making of any white woollen

cloths in any place where their manufacture had not been established for ten years. It further interdicts any one from setting up the trade of a weaver, unless he have served an apprenticeship of seven years to the same, and no weaver dwelling out of a city is to have more than two apprentices at a time. If to cramp and crush commerce was the intention of these laws, they were admirably framed. How little could the true interests of a nation depending on commerce have been understood, and how short-sighted must have been the views of the framers of such laws; nevertheless, they accorded with the general feelings of the parties most interested in the extension of the woollen trade; their eyes were not open to their true interests, and even still the feeling against machinery is strong amongst those who cannot see how their own welfare is intertwined with that of the nation at large. They forget that our manufactures have to run a severe race of competition with those of other countries, and they know not that if the failure is on our side their own immediate interests are periled, if not quite ruined. That the edicts above referred to were of evil operation and tended to nurture those prejudices from which they sprung, abundant facts will testify. "These acts (says Mr. McCulloch) were not, as may perhaps be supposed, allowed speedily to fall into disuse; on the contrary, their provisions were every now and then put into execution. So late as 1802 there were serious disturbances in Somersetshire and Wiltshire, on account of the manufacturers setting up gig-mills, or machines for raising the nap on cloths, it being contended that they were prohibited by the act of Edward VI. Nor was the public rendered fully aware of the real nature and powerful influence of the acts in question, till the publication of the 'Report on the Woollen Manufactures,' by the Commons' committee in 1806. Hence, notwithstanding all the circumstances favourable to the manufacture in England, and which, *had it been let alone*, would have ensured its rapid advancement, it was long in a very backward and depressed state. The Dutch and Flemings retained a decided superiority over the English till the end of the seventeenth century; it was not indeed till 1668, when some immigrants from Flanders settled in England, that we succeeded in producing any of the finest cloths, or those made entirely from Spanish wool, without the admixture of any wool of an inferior quality." Who could expect otherwise from the prohibition of machinery? Since the time of Edward III. to the accession of George III., few, if any, improvements had been introduced into the machinery connected with the woollen manufacture; it remained in the same simple condition, varying perhaps in some degrees of rudeness, but still unimproved in its principles; as their forefathers carded, and spun, and wove,

so on the same plan did their successors continue; it was hallowed by antiquity; it was most probably unaltered, certainly not improved, from the time in which Britain was a Roman province—nay, it may be presumed that many modes and contrivances, then in usage, became lost in the troublous times that succeeded the departure of the great civilizers of the world, and were never afterwards recovered. Thus age after age passed by, and while arts and sciences rose up in the land, the woollen manufactures continued in the ancient routine. But the day was at hand in which a new impulse was to be given, and that moreover through another species of manufacture—namely, that of cotton. Well has an anonymous writer thus expressed himself. “Had not the genius of Hargreaves and Arkwright changed entirely the modes of carding and spinning cotton, the woollen manufacture would probably have remained at this day what it was in the earliest ages of civilized society.”

Here again we must have recourse to the statistics of Mr. McCulloch, who has thrown something of attraction around details which few have patience to wade through, albeit they deserve the attention of all interested in the statistical account of the British empire.

After noticing the depression, or rather the stagnation of the woollen trade, in consequence of the blind adherence to antiquated processes, he says—“But the astonishing improvements made in the cotton trade roused at length the dormant energies of the woollen manufacturers, and stimulated them to make something like corresponding efforts. In consequence machinery began, in the interval between 1785 and 1800, to be everywhere employed in the carding and spinning of wool, until the performance of these processes by hand-cards and spinning-wheels was wholly abandoned. The repeal of the acts of Edward VI. and of Philip and Mary in 1807, paved the way for the general introduction of gig-mills, shearing-mills, brushing-mills, &c. The power-loom is as yet (1839) but little introduced into the cloth trade, and is employed only in weaving the finer description of goods. This is supposed to be owing to the loose

way in which the yarn is spun, which while it facilitates the power of felting, makes it unsuitable for the power-loom.—(*Report on Yorkshire Factory Commission*, c. i., p. 168.)

Towards the end of the seventeenth century, Mr. Gregory King and Mr. Davenant (*Davenant's Works*, *Whitworth's edition*, vol. ii., p. 233) estimated the value of the wool shorn in England at £2,000,000 a-year; and they supposed that the value of the wool (including that imported from abroad) was quadrupled in the manufacture, making the entire value of the woollen articles annually produced in England and Wales £8,000,000, of which about £2,000,000 were exported. In 1700 and 1701, the official value of the woollens exported amounted to about £3,000,000 a-year. Owing to the vast increase in the wealth and population of the country, the manufactures must have been very greatly extended during the last century, but the increase in the amount of the exports was comparatively inconsiderable. On an average of the six years ending with 1719, the annual official value of exports was £3,544,160 a-year, being an increase of only about £540,000 on the amount exported in 1700. The extraordinary increase of the cotton manufacture soon after 1700, and the extent to which cotton articles then began to be substituted for those of wool, though it did not occasion any absolute decline of the manufacture, no doubt contributed powerfully to check its progress. In 1802 the official value of the exports rose to £7,321,012, being the largest amount they ever reached, till 1833, when they amounted to £7,788,842. During the five years ending with 1836, every part of the manufacture was in a state of unexampled improvement and extension, notwithstanding the price of wool was, for the greater part of this period, very high; but in consequence of the revulsion in the trade with the United States, the manufacture declined considerably in 1837.” Here the learned writer adds—“No doubt this decline will be but of temporary duration;” on this point we will not give any opinion. Who can foresee the preponderance of the scale in the commercial balance of empires?

The official and the declared or real values of the Woollen Manufactures exported from the United Kingdom during the years 1831-2-3-4-5-6 and 7.

	1831	1832	1833	1834	1835	1836	1837
Official value of woollen manufactures exported	-	£6,544,576	£7,788,842	£6,514,703	£7,406,809	£7,541,365	£4,681,625
Declared or real value of ditto	-	5,227,701	6,294,432	5,736,871	6,840,511	7,639,354	4,655,977

The following is an account of the quantity and real value of British Woollen Manufactures exported from the United Kingdom in the year 1837, specifying the countries to which they were exported, and the quantity and value of those exported to each. (*Parliamentary Papers, No. 340, Sess. 1838.*)

COUNTRIES TO WHICH EXPORTED. 1837.													
Cloths of all sorts.	Pieces.	Napped Coating, Duffels, &c.	Kerseys.	Baizes of all sorts.	Stuffs, Woollen or Worsted.	Flannel.	Blankets & Blan- keting.	Carpets and Car- peting.	Woollens mixed with Cotton.	Hosiery—viz., Stockings, Wool- len or Worsted.	Hosiery, not other- wise described; Rugs, Coverlids, &c.	Declared Value of British Woollen Manufactures exported from the United Kingdom.	
			Pieces.	Pieces.	Pieces.	Yards.	Yards.	Yards.	Yards.	Dozs.	Prs.	£	
Russia	2,691	9	219	10	33,884	6,902	9,790	13,424	20,162	157	0	146	103,159
Sweden	88	—	33	1	7,269	802	762	4,152	2,400	131	0	155	14,191
Norway	457	28	123	34	2,689	3,503	1,122	48	800	153	0	281	10,646
Denmark	57	10	12	—	855	12	360	720	184	—	—	161	2,042
Prussia	15	—	1	—	9	337	100	—	—	—	—	—	92
Germany	6,073	11,909	3,824	375	387,373	351,274	11,140	46,951	264,557	1,847	0	9,212	725,607
Holland	1,336	5,165	821	13,908	85,964	238,229	1,365	33,565	35,104	13,066	0	3,683	265,876
Belgium	3,797	4,415	309	83	59,748	242,712	3,560	8,332	100,754	8,423	6	1,679	144,455
France	540	306	261	52	18,505	11,655	880	12,554	24,686	28	0	1,609	45,570
Portugal, Azores, and Madeira	22,330	452	1,313	10,883	23,030	16,218	5,204	7,375	35,950	83	0	1,927	201,232
Spain and the Canaries	1,172	24	99	1,535	12,179	4,634	7,155	2,349	1,594	96	0	150	42,120
Gibraltar	4,238	70	363	189	7,251	7,762	820	1,497	48,972	324	0	764	47,042
Italy	8,496	—	1,195	—	66,913	6,204	2,834	25,362	106,000	343	0	3,117	178,655
Malta	575	—	62	20	1,480	568	300	72	8,000	108	0	39	7,472
Ionian Islands	105	20	16	—	528	4,037	360	282	10	518	0	270	3,163
Turkey and Continental Greece	825	24	51	7	4,702	225	800	7,405	1,660	18	0	253	14,420
Morea and Greek Islands	—	—	—	—	12	158	—	—	—	—	—	40	80
East Indies and China	66,002	—	165	345	77,912	72,078	44,188	4,534	38,140	859	0	3,904	480,091
New South Wales, Van Diemen's Land, Swan River, and South Australia	3,583	18	681	159	4,897	67,916	156,226	35,232	10,831	2,290	0	5,515	75,660
Cape of Good Hope	4,432	517	1,023	820	10,794	35,991	17,170	7,425	14,466	941	0	2,293	60,882
Other parts of Africa	1,702	—	15	20	3,734	2,246	5,700	510	1,930	276	0	1,148	18,744
British Colonies in North America	52,009	329	598	197	33,287	354,476	341,332	132,509	46,460	18,345	8	18,175	392,079
in West Indies	9,735	143	216	5,751	16,991	56,613	137,578	3,306	11,660	2,984	6	9,598	125,702
Foreign West Indies	3,759	8	75	40	8,219	6,000	138,998	1,016	5,386	—	—	1,770	58,335
United States of America	126,946	59	4,621	95	127,381	85,134	1,291,112	276,776	136,939	19,949	4	16,403	1,045,279
Brazil	24,253	20	894	6,116	18,547	1,980	152,193	11,951	66,191	852	0	4,866	182,428
Mexico and States of South America	39,676	—	5,925	2,736	23,920	24,036	17,010	91,984	73,330	3,065	0	3,072	467,858
Isles—Guernsey, Jersey, Alderney, and Man	2,893	79	15	101	3,563	83,754	23,624	24,653	86	89	0	2,387	4,306
TOTAL	387,785	23,605	22,930	43,477	1,041,636	1,685,457	2,431,683	753,964	1,051,972	74,947	0	92,617	4,655,977

At the commencement of our work, when speaking of the value of the sheep as a wool-bearing animal, we stated, on the authority of Mr. M'Culloch, that the total annual value of woollen manufactured articles might be taken upon an average at £22,500,000, considering their value as three times that of the raw material, which may be estimated at about £7,500,000. According to the same authority, the total number of persons employed in manufacture is about 334,600; and he adds, "Notwithstanding the carding engine, the spinning frame, the gig or raising machine, the shearing machine, the brushing machine, &c., have been mostly introduced since 1790, it is the opinion of some well-informed manufacturers, that as many hands are required to produce the same quantity of cloth as at the last-mentioned epoch. This result, so different from what might have been expected, is accounted for by the fact, that a great deal more work is now expended upon the cloth, the appearance of which has been vastly improved. In 1793, cloth of a medium quality, worth at the time about 13s. a-yard, was made of the best English wool. In 1815, middling cloth was made of Spanish wool, and cost 16s. or 17s. a-yard; while in 1832 similar cloth was made of German, and cost about 12s. a-yard; but owing to the improvement of the manufacture, cloth produced in 1832, though not actually finer than that produced in 1793, had a great deal better appearance; so much so, that we have been assured by undoubted judges that cloth worth only 10s. a-yard in the former year looked quite as well as cloth worth 13s. in the latter. The deterioration (rather alteration) in the quality of English wool, occasioned by the farmers having laboured to increase the carcase, though at the expense of the fleece, is the reason that it is now seldom used, unless mixed with foreign wool, in the manufacture of the finer cloths."

It is the opinion of some writers that the supposition respecting the treble increase in the value of the raw material, when it has passed through the processes of the woollen manufacture, is erroneous, and that its aggregate value is only doubled; that is, if the value of English wool only is taken, and not the combined value of the home growth and of foreign imports. The following, on these principles, is an estimate of the value of the woollen trade in 1834:—

108,000,000 lbs. of English wool, at 1s. 3d. per lb.	£6,750,000
46,535,232 lbs. of imported wool, at 2s. 6d. per lb.	5,806,904
Wages of 350,000 persons, at £25 each	8,750,000
Dye wares, oils, and other raw materials	1,450,000
Wear and tear of sunken capital, profits, &c.	4,250,000
Total value	£27,006,904

For the manufactured exports of this year, refer to page 151.

In the year 1837, the total quantity of wool imported into the United Kingdom, including the produce of the isles of Guernsey, Jersey, and Man, amounted to 48,388,292 lbs.

The quantity of foreign sheep and lambs' wool retained for home consumption was as follows:—

Charged with duty at 1d. per lb.	22,554,385 lbs.
Ditto at ½d. per lb.	10,529,141 "
Ditto at 6d. per lb. (being red or vicuña wool)	2,611 "
Duty free, being the produce of British possessions	9,429,762 "
	42,515,899 lbs.

The quantity of foreign sheep and lambs' wool re-exported to the continent of Europe, America, &c., was 2,831,352 lbs.; and the quantity remaining housed under bond on the 5th of January, 1838, was 9,078,267 lbs.

During the year 1837 there were exported 2,647,874 lbs. of British wool, and 2,513,718 lbs. woollen, in worsted yarn, making a total of 5,161,592 lbs.

A laboured essay in order to prove the importance of the woollen trade, after these brief statistics, would be waste of time. We may be permitted, however, to glance at the chief places in England which have a claim to be regarded as the seats of this particular branch of our manufactures.

Turning northward, the West Riding of Yorkshire at once attracts our notice. This is one great field of cloth, having Leeds, Bradford, Halifax, Huddersfield, Wakefield, &c., as its rallying points; besides which, large villages might be enumerated, each having its busy population. Coloured (or, as it is termed, *mixed*, or, in other words, wool-dyed) and white broad-cloths, baizes, blankets, and flushings have each their allotted territorial limits, although they sometimes trench upon each others' boundaries. Worsted spinning prevails at Bradford; stuffs are made in Halifax and Leeds; Huddersfield and its neighbourhood furnishes narrow cloths; Saddleworth broad-cloths and kerseymeres; at Wakefield, celebrated for its wool market, white cloths are manufactured, and the art of dyeing is carried on very extensively, and on scientific principles. The precincts of Battley and Dewsbury present us with establishments called *Shoddy Mills*. Shoddy is prepared from old woollen rags and refuse goods, with which a little new wool is occasionally, or perhaps generally, intermixed. This is made up into *padding* and similar articles, but sometimes *shoddy* is mixed up in the tissue of cloth (not by the established and respectable manufacturers), in

order to give it a substance which is altogether deceptive, and a surface which indeed "fades in an hour."

We believe that we are correct when we say, that the woollen manufactures of Yorkshire bear, in respect to those of the whole of England, the proportion of three-fourths. Mr. M'Culloch states, that of 1,102 woollen factories, employing 65,461 work-people in England, 601 factories and 40,896 individuals belonged to the West Riding of Yorkshire. This estimate was made in 1834, but the changes which have since taken place are not such as to invalidate the general outline.

In Leeds, Halifax, Bradford, Huddersfield, &c., halls or emporiums for the sale of cloth have been long established, and the transactions there conducted are, as may be supposed, upon a most extensive scale. Nevertheless, all the cloth sold does not pass through the halls; for many buyers make extensive purchases upon the samples submitted to their inspection, and have the cloth sent directly to their warehouses.

As a general rule, the cloth submitted for sale in halls is rough or undressed. When purchased it is sent to the *finishing shops*, as they are called, where it is shorn, dressed, and made ready for the general market.

Rochdale and the adjacent parts of Lancashire, on the border line of the West Riding of Yorkshire, may be regarded as adjuncts to the latter county. Baizes, flannels, and broad-cloths are here manufactured. If however we take Lancashire as a whole, cotton may be said to have driven out wool. We need not say that Manchester is the great metropolis of the cotton manufactures; but formerly, Manchester was noted for woollens—such as rugs, friezes, &c.—and Byrom was one of the great clothiers of the olden time. He kept an establishment of spinners, carders, weavers, fullers, dyers, shearmen, &c., and ranked with Cuthbert of Kendal, and Hodgeskins of Halifax. Camden speaks of the "Manchester cottons;" but the "cottons" in his day were not composed of the fibres of that plant which now employs the labour of millions, from its growth to the manufacture and sale of its woven down. These "cottons" were coarse woollen textures; and an act which passed in 1552 directs that "all the cottons called *Manchester, Lancashire, and Cheshire Cottons*, full wrought to the sale, shall be in length twenty-two yards, and contain in breadth three-quarters of a yard in the water, and shall weigh thirty pounds in the piece at least. Also, that all other cloths called *Manchester Rugs*, otherwise named *Manchester Frizes*, fully wrought for sale, shall contain in length thirty-six yards, and in breadth three-quarters of a yard coming out of the water, and shall not be stretched on the tenter or otherwise, above a nail of a yard in breadth; and being so fully

wrought and well dried shall weigh, every piece, forty-eight pounds at the least."

In former times, *Aulnagers* or *Alnegers*, that is, sworn officers for the inspection of woollens, and the prevention of frauds, were appointed in various towns. It is said they villainously abused their trust, and looked rather to their own interests than those of the crown. Be this as it may, in 1565 Manchester was one of the towns selected for the residence of an *Alneger*, or of some of his deputies—a fact sufficient to prove what the Manchester "*cottons*" were. Indeed, it was not until the early part of the eighteenth century that the *vegetable* cotton swept away the *wool* cotton from that mighty town—that city of "mills"—that nursery of the practical sciences.

All have heard of west-country cloth—superior broad-cloth. The counties in which this manufacture is carried on are Gloucestershire, Wiltshire, and Somersetshire.

In Gloucestershire, both fine broad-cloths and fancy narrow goods are made, especially in the parishes of Avening, Painswick, Pitchcomb, Randwick, Merchirhampton, Stroud, Biesley, Radborough, Stonehouse, King's Stanley, Leonard Stanley, Wood-Chester, Horsley, and Eastingdon. Of this district, called the *Bottoms*, Stroud may be considered as the centre. But extensive works are carried on at other places; and along the banks of the Frome fulling-mills are thickly studded.

Wiltshire is celebrated for broad-cloths of superfine texture, and Bradford, with the surrounding district, including Trowbridge, Westbury, Melksham, and Chippenham, constitutes the great seat of this branch of the woollen trade. We may also notice Wilton, Heytesbury, and Calne, celebrated for cloths of various textures and qualities, but all fine; indeed the superfine broad-cloth of Wiltshire ranks in the highest grade of excellence.

In Somersetshire, Frome produces a large supply of superfine cloth, and Taunton a good quantity of coarse and second cloth. We may here add, that in some parts of the adjacent county of Dorsetshire, as at Sturminster, Newton, &c., white baizes and flannels are somewhat extensively manufactured.

Passing at once to our eastern counties, the county of Norfolk claims our chief notice. It has long been the principal seat of the stuff or worsted manufacture. We have already said that the name of Worsteds is derived from a parish so called, where twists and stuffs were first made. But this manufacture was early transferred to Norwich*

* There is an extensive manufactory at Norwich for mohair-twist for the making of plush. The greater part of the mohair-twist is now exported to France. In 1336, Norwich was colonized by Flemings; and it is calculated that in the reign of Elizabeth the city received four thousand Flemings, who fled from the Low Countries to escape the persecution of the Duke of Alva. It was to their industry and knowledge that Norwich owed the establishment of its great manufactures.

and other towns, now noted for camlets, bombazines, crapes, and shawls, &c. The chief part of the yarn now made use of in the Norwich fabrics is prepared at Bradford, in Yorkshire; and indeed the worsted manufacture of the West Riding of that county is now more extensive and valuable than that of Norfolk. When speaking of worsted yarn we must not forget Leicestershire and Warwickshire, in which counties it is produced in considerable abundance.

Leicestershire and Nottinghamshire have been long known as the seats of the manufacture of woollen and worsted stockings, &c. Leicestershire, in 1833, contained between eleven and twelve thousand stocking frames, divided between Leicester, including the adjacent districts, Loughborough, celebrated for its patent fleecy hosiery, Hinckley, and other places of less note.

Exclusive of the leading fabrics to which we have thus briefly alluded, an immense variety of woollen goods is manufactured in various places. To recapitulate the names even of these would occupy some pages, and besides would be a tedious task, somewhat alien perhaps to our main design. A few lines however on this subject may be excused.

In Devonshire, the contiguous parts of Cornwall, and some districts of Somerset, druggets, long-ells, &c., are made. These are sold as they come from the loom to the merchants of Exeter, by whom they are milled, dyed, finished, and afterwards exported. At one time the East India Company were the principal buyers of long-ells; but as these articles are little used at home, and as the exports have declined, the manufacture is no longer in a flourishing state. Formerly, at Modbury, in Devonshire, an extensive plush manufacture was carried on, the machinery of which was most ingenious and effective; but we believe that time has almost, if not quite, effected a revolution in this branch of trade.

A few years ago some of the towns of Essex, such as Colchester, Bocking, Braintree, Coggleshall, &c., produced large quantities of baize; but Rochdale and Bury, in Lancashire, now take the lead. At the latter place flannels are extensively manufactured. Blankets, coarse cloth, and baize, are made at Chichester, in Sussex. Witney, Dewsbury, Dulverton, &c., give their names to blankets; but most of the Witney blankets are now woven in Glamorganshire, and sent to the markets of that town for sale. With respect to carpets they are manufactured in every variety of quality at Kidderminster, Wilton, Cirencester, Worcester, Axminster, &c. Those of Wilton and Axminster, and Quatford, near Bridgenorth, are especially celebrated.

Coarse woollens, druggets, &c., are made in considerable quantities in Kendal, Ambleside, and

Keswick. Druggets, shalloons, serges, and a variety of worsted articles, at Andover, Basingstoke, and Alton, in Hampshire; worsted shags at Banbury and Coventry; rugs at Bradford; and fleecy hosiery at Godalming, in Surrey. Light stuff, bunting, crape, &c., are made at Sudbury, Bury St. Edmunds, Needham Market, and Lavenham. Woollen yarn is likewise made at Mottram, in Cheshire, and in various parts of Lancashire.

In Wales the woollen manufacture is situated principally in the counties of Montgomery, Merioneth, and Denbigh. The most important products are webs, flannels, stockings, gloves, &c. Flannels are made in Montgomeryshire and in the district around Welshpool; and this branch of trade extends itself into Shropshire. Strong cloth, for workmen's jackets, ironing cloths, &c., is made in Merionethshire, and small cloth in Denbighshire.

In Scotland the woollen manufacture is inconsiderable compared with that of England. Formerly it was usual for the occupiers of land to spin in their own houses the greater part of their own wool, and send the yarn to a weaver in a contiguous village to get it woven into a species of coarse cloth called *plaiding*; but this sort of manufacture, which is characteristic of a rude or backward state of society, is now entirely or almost entirely abandoned. "Factories for the making of fine cloth have been set on foot in various parts of Aberdeenshire and in some other counties; but coarse cloth still continues to form the staple article of Scotch manufacture. Some of the woollen spinning mills and factories established at Aberdeen and its vicinity, are upon a very large scale. Coarse cloths are pretty largely produced at Galashiels, Jedburgh, &c., but particularly the first, where their quality has been much improved. They used also to be produced in considerable quantities at Hawick; but the attention of the manufacturers of the latter place is now principally directed to the production of woollen hose, of which they annually furnish about 500,000 pairs, exclusive of blankets and flannels. Tartans are chiefly produced in the counties of Stirling (principally in the town), Argyle, and Inverness. Bonnets, which were at one time almost universally worn by the middle and lower classes, are now everywhere throughout the lowlands superseded by hats; and they are also rapidly disappearing in the highlands. At Kilmarnock, which is one of the most flourishing manufacturing towns in Scotland, about one thousand weavers are employed in the carpet manufacture, which is also carried on at Stirling and some other places. Kilmarnock is farther supposed to furnish an annual supply of about 1,200,000 worsted shawls, besides large numbers of bonnets and foraging caps for the army. Altogether there

were in Scotland, in 1834, ninety woollen factories, employing 3,505 work-people."—*M'Culloch*.

Further into these details we shall not proceed; a good article may be found in the *Penny Cyclopædia* on wool, in which some clear statistical details are given, besides a general account of the 'Processes of the Woollen Manufacture.' Into the latter subject we shall not venture—for these processes, to be really and definitely understood, must be carefully investigated.

With respect to the names and respective characters of the tissues of which wool constitutes either the sole or chief ingredient, so great is their diversity, and so frequently are changes made, that any attempt at enumeration or description is out of the question. The following short extract will serve to give an idea on the subject:—

"Plain *broad-cloth* is a specimen of plain weaving followed by the fulling process; whereas *kersey-mere* is a *twilled* fabric similarly fullled. *Serges* are *twills*, having *worsted* warp and coarse woollen weft. *Blankets* are made of very soft yarn, afterwards worked up into a kind of pile by milling; and many varieties of coarse cloth are of analogous structure. *Bombazeen* is a *twilled* mixture of *worsted* and silk; whereas *poplin* is an *untwilled*

mixture, showing more silk than *worsted* at the surface. Goods called *Saxonies* and *Orleans* are made of woollen, sometimes intermixed with cotton, and afterwards printed. *Stuff* is made wholly of *worsted*; while *Merino* is a fine woollen twill sometimes printed. The material called *Cashmere*, if properly so named, is made of the shawl-goat wool, much in the same way as *Merino*; but most of the fabrics so called are made of sheep's wool. *Challis* is a mixture of woollen weft with silk warp, and is generally printed. *Mousselin de laine* was originally all wool, but is now frequently mixed with cotton and generally printed. *Norwich crape*, unlike *common crape*, is composed of wool and silk, something like *challis*, but without being printed.—(Ordinary crape is a light transparent fabric composed of *silk*, from which, by the mode of its preparation, all the gloss has been taken, and which is generally dyed black). *Crêpe de Lyons* is formed of *worsted* and silk, and *Italian net* of *worsted* only. These examples are only intended to indicate the sources of the varieties in woollen and *worsted* goods, for to enumerate all the varieties themselves would be nearly impossible. This is particularly the case with respect to *waistcoatings*, where *fancy weaving* adds another to the sources of diversity."

CHAPTER X.

ON THE LLAMA AND SOME OTHER WOOL-BEARING ANIMALS.

WE cannot quite leave this branch of our subject without a notice of two wool-bearing animals (if under the name of one we include certain varieties or species) of great celebrity. We allude to the llama and its allies, and to the shawl-goat of Thibet.



THE LLAMA.

The llama and its allies are natives of the Cordilleras of Peru and Chili, and are classed by

Illiger under a genus termed *Auchenia*, which in many agrees with that of the camel (*Camelus*), although the latter animal is fitted for a different kind of locality, viz., the expanse of the Sandy Desert.

We need not here repeat the history of the llama, but may refer those desirous of entering into it to the *Penny Cyclopædia*, vol. xiv., p. 68; to the *Penny Magazine* for 1839, p. 457; and the *Pictorial Museum of Animated Nature*, vol. i., p. 122.

It may, however, be proper to observe that the Peruvian word *Llama* is merely equivalent to our terms "cattle or sheep," and is equally applied to all the varieties of species. Thus, according to John de Laet (fol. Leyden, 1633), the native *shepherds*, if the word be allowed, call the different kinds respectively *Llama-michec*, *Huanacu-llama*, *Paco-llama*, &c. In Europe, generally, naturalists have appropriated the term *Llama* to the large tame animal, and distinguish the others by names of barbarous origin and uncertain meaning. But, indeed, it is by no means a settled point into what varieties or species the genus *Auchenia* is divided. Laet, who enumerates several species besides the domestic race, says of the latter that it is found,

like the horse, of different colours, while the wild llama is only of one colour like chestnut. However, according both to this writer and Acosta, there were two domesticated kinds—one, covered with a woolly fleece, and called *Paco* by the natives; the other, covered with a light fleece, and, being unencumbered, more fitted for carrying burdens; it was called the *Guanaco* or *Huanacu-llama*, from its similitude to the wild animal called *huanacu*. These tame guanacos (our llamas) are described as being larger than sheep but less than heifers (a fair latitude it must be confessed), with a long neck like the camel's, lofty legs, and a compact body. Their colour is various, for some are white, some black, some brown, and some piebald. "Their flesh," says Acosta, "is good though rather gross, but that of the lambs is much the best and the most delicate; but they are rarely killed, because they are of far greater use as beasts of burden, and their wool serves for making cloth. This wool the barbarians clean, spin, and weave into garments; but it is of two sorts, one coarser and more common, which they call *havasca*, the other finer and more loose, which they call *cumbi* (or, according to Garcilaso, *compi*). From this last they weave various curtains and hangings of most elegant workmanship, which last a long time, and in splendour do not yield to silk; nay, what is wonderful for barbarians, they are so neat in their weaving that the elegance is nearly equal throughout, nor is the web or the woof ever apparent. The ancient Peruvian monarchs kept up many works for weaving *cumbi*, the principal artificers in which lived at *Capachica*, on the banks of the lake of *Titicaca*. These wools they dyed with the juice of various herbs, according as the nature of the work required. But most of the Peruvian barbarians are cunning in this weaving, and have in their huts instruments adapted for this art, and from these sheep they draw most of the necessities of human life. By far the greatest use of these animals, however, is in carrying burdens; for sometimes a drove of three hundred, sometimes of a thousand, carry various articles of merchandise, skins of wine, chocolate, maize, *chunno*, and quicksilver to *Potosi* and the other mines and towns." Acosta then observes that he has often wondered how large droves of these animals, consisting of a thousand, and not unfrequently laden with silver worth 3,000 ducats, should proceed on their journey from *Potosi*, and make their way, accompanied only by a few barbarians, who direct them, and load and unload them, passing the night in the open air, with a guard of only one or two Spaniards, and that with such safety that a bar of silver is scarcely ever missed. The burden of each beast amounts to 100 and sometimes 150 lbs., which they carry three, or at the most four, leagues a day, according to the length of the

journey. The leaders know the proper resting stations, where food and water abound. Here they pitch their tents, and unload their beasts. When, however, they have only one day's journey to make, the llamas are able to bear a load of even 200 lbs., or to move forward as many as eight or ten leagues. These animals rejoice in a cool rather than in a fervid temperature, and are therefore bred and kept in immense numbers on the mountains, whilst they fail in the plains on account of the too great heat. The guanacos (tame) are of a mild and gentle aspect; often as they move along they stop and regard the passers-by without any expression of fear or pleasure, yet so attentively, and with erected neck, that it is difficult to abstain from laughter. Sometimes they become so suddenly terrified that they run off to the mountain precipices with the greatest swiftness, and it is necessary to shoot them in order to save their loads. The pacos also become so enraged sometimes, or are so wearied, that they lie down with their burdens, and cannot be made to rise either by threats or blows; whence a proverb has arisen, and stubborn or obstinate men are said to be *Impacatos*. For this there is no better remedy than to sit down by the animal until by his blandishments the driver prevails on the animal to rise spontaneously.

Besides the domesticated animals, the *paco-llama*, and the *guanaco-llama*, De Laet notices the wild *guanaco*, the *vicuña* or *vicugna*, and the *taruga* or *taruca*. This latter animal is described as being swifter and larger than the *vicuña*, of a more burnt colour, with pendulous light ears, and instead of associating as wandering about the precipices singly.

Captain G. Shelvocke, who sailed round the world in 1719-22, describes a species called *chilihueque* by the Chilese, but this word is evidently a modification of the term *huanaco*.

Without rendering the subject more perplexing, we may state what we consider the species of this genus to be, as far as we have been able to determine,

1st, *Tame and Wild*.—The *guanaco*, *guanacu*, or *huanacu*, commonly called in its tame state the *llama* (*Auchenia Llama*).

2ndly, *Tame and Wild*.—The *paco*, *paca*, or *alpaca* (*Auchenia Alpaca*, Desm.).

3rdly, *Wild*.—The *vicuña*, *vicugna*, *vigognia*, &c. (*Auchenia Vicuña*).

4thly *Wild*.—The *taruga*, or *taruca* (*Auchenia Taruca, nobis*). A doubtful species respecting which we require more precise information. It may be the wild alpaca. Some zoologists consider that there are only two really definite species, the *guanaco* and the *vicuña*.

With respect to the *tame* *guanaco*, or *llama*, kept by the Peruvians and Chilians from a remote period, and employed by them as a beast of burden,

valuable for its flesh, its fleece, and even for its milk, little need be said. The specimens which have come under our notice have been some brown, others white; the wool on the body is long and soft, varying in fineness; the head, neck, and limbs covered with close hair. The domestic llama is more stoutly built than the guanaco; its limbs are thicker, its head shorter, and the aspect less animated; to judge from our own experience, the white individuals exceed the brown in size, and have longer but much coarser wool.

The wild guanaco is more slender than the domestic variety, and has an aspect more expressive of spirit and energy, but it soon becomes familiar in captivity. It lives in the highlands of Patagonia, Chili, and Peru, descending into the valleys on the approach of winter. Mr. Darwin, whose account of these animals (in the *Voyage of the Beagle*) is full of information, states that the guanaco abounds over the temperate parts of South America, from the wooded islands of Tierra del Fuego, through Patagonia, the hilly parts of La Plata, Chili, even to the Cordillera of Peru. Although preferring an elevated site, it yields in this respect to its near relative, the vicuña. On the plains of Southern Patagonia we saw them in greater numbers than in any other part. Generally they go in small herds of from half-a-dozen to thirty together, but on the banks of the St. Cruz we saw one herd which must have contained at least five hundred. On the southern shores of the Strait of Magellan they are also very numerous. Generally the guanacos are wild and extremely wary. The sportsman frequently receives the first intimation of their presence by hearing from a distance the peculiar shrill neighing note of alarm. If he then look attentively he will perhaps see the herd standing in a line on some distant hill. On approaching them a few more squeals are given, and then off they set at an apparently slow but really quick canter along some narrow beaten track to a neighbouring hill. If however by chance he should abruptly meet a single individual, or several together, they will generally stand motionless and intently gaze at him; then, perhaps, move on a few yards, turn round, and look again. What is the cause of this difference in their shyness? Do they mistake a man in the distance for their chief enemy, the *puma*? or does curiosity overcome their timidity? That they are curious, is certain; for if a person lies on the ground and plays strange antics, such as throwing up his feet in the air, they will almost always approach by degrees to reconnoitre him. It was an artifice that was frequently practised by our sportsmen with success, and it had moreover the advantage of allowing several shots to be fired, which were all taken as parts of the performance. On the

mountains of Tierra del Fuego, and in other places, I have more than once seen a guanaco, on being approached, not only neigh and squeal, but prance and leap about in the most ridiculous manner, apparently in defiance as a challenge.

"These animals are very easily domesticated, and I have seen some thus kept near the houses, although at large on their native plains; they are in this state very bold, and readily attack a man by striking him from behind with both knees. The wild guanacoes however have no idea of defence; even a single dog will secure one of these large animals till the huntsman can come up. In many of their habits they are like sheep in a flock. Thus, when they see men approaching in different directions on horseback, they soon become bewildered, and know not which way to run. This greatly facilitates the Indian method of hunting, for they are thus easily driven to a central point and encompassed.

"The guanacos readily take to the water. Several times at Port Valdes they were seen swimming from island to island. Byron in his voyage says he saw them drinking salt-water. Some of our officers likewise saw a herd drinking the briny fluid from a salina near Cape Blanca. I imagine that in several parts of the country, if they do not drink salt-water, they drink none at all. In the middle of the day they frequently roll in the dust, in saucer-shaped hollows. The males fight together. Two one day passed quite close to me, squealing and trying to bite each other, and several were shot with their hides deeply scored. Herds sometimes appear to set out on exploring parties. At Bahia Blanca, where within thirty miles of the coast these animals are extremely unfrequent, I saw one day the track of thirty or forty, which had come in a direct line to a muddy salt-water creek. They must then have perceived that they were approaching the sea, for they had wheeled with the regularity of cavalry, and had returned back in as straight a line as they had advanced.

"The guanacos have to me one singular habit which is inexplicable, namely, that on successive days they drop their dung in the same defined heap. I saw one of these heaps, which was eight feet in diameter, and necessarily was composed of a large quantity. D'Aubigny says that all the species of this genus have this habit, and Frezier remarks that it is very useful to the Indians, who use the dung for fuel, and are thus saved the trouble of collecting it. The guanacos appear to have favourite spots for dying in. On the banks of the St. Cruz the ground was actually white with bones in certain circumscribed places, which were generally bushy, and all near the river. On one such spot I counted between ten and twenty heads. I particularly examined

the bones : they did not appear, as some scattered ones I have seen, gnawed and broken, as if dragged together by some beasts of prey. The animals must have crawled before dying beneath and amongst the bushes. Mr. Bynoe informs me that during the voyage he observed the same circumstance on the banks of the Rio Gallegos. I do not understand the reason for this, but I may observe that all the wounded guanacos at St. Cruz invariably walked towards the river. At St. Jago, in the Cape de Verd Islands, I remember having seen in a retired ravine a corner under a cliff, where numerous goat's bones were collected ; we at the same time exclaimed that it was the burial-ground of all the goats in the island. I mention these circumstances because in certain cases they might explain the occurrence of a number of uninjured bones in a cave, or buried under alluvial accumulations, and likewise the cause why certain mammalia are more commonly imbedded than others in sedimentary deposits. Any great flood of the St. Cruz would wash down many bones of the guanaco, but probably not a single one of the puma, rhea, or fox."

The wool of the guanaco is fine, the general colour is a rich rufous brown ; the head and part of the neck are gray. The neck is long, the tail a little raised up and curved down. Height at the top of the shoulders about $3\frac{1}{2}$ feet.

With respect to the paco, paca, or alpaca, Cuvier says, "It is a variety of the llama, with long woolly hair," an opinion in which Mr. Bennett agrees ; but Mr. Fred. Cuvier regards it as a distinct species, and as the natives, according to Acosta, do not consider it as identical with the guanaco, and as De Laet distinguishes the tame paco from the tame guanaco, we incline to the opinion of Mr. F. Cuvier. A jet black specimen of the alpaca existed some years since in the gardens of the Zoological Society of London, and after its death was preserved and placed in the museum. It was covered with long flakes of glossy, silken wool, reaching down to the knees ; the neck was also covered with this wool, but the face, with close hair, as were also the limbs, which were proportionally shorter than those of the guanaco. Hence, it stood lower than the white llama, and was somewhat smaller altogether, its deep, long falling fleece making it appear larger than it was in reality. It is of this animal, the paco-llama, that De Laet says, "It is only fed for the sake of its flesh and its wool, which is the best and longest ;" and he adds, "it is unequal to the carrying of burdens," thereby meaning that it cannot compete with the llama, and soon becomes wearied, and lies down, as Acosta, whom he quotes, has expressly stated.

Respecting the wild alpaca, little is definitely known. It is said to be of a deep fawn colour,

and to dwell in herds, frequenting the higher parts of the mountains of Peru, often in company with herds of vicuñas.



THE VICUÑA.

The vicugna, or vicuña, is a much smaller and lighter animal than either the guanaco or the alpaca, and is covered with a short silky wool, of extraordinary fineness. This wool varies from an inch to three inches in length ; it is longest on the breast, and short on the head and limbs. The colour generally is of a pale yellow brown, passing to white on the under parts.

The vicuña lives in herds on the bleak and elevated parts of the mountain range bordering the region of perpetual snow ; it tenants the Cordilleras of Copiapa Coquimbo and Peru, but is also found in Chili. In its manners it very much resembles the chamois of the European Alps, and is as active, vigilant, wild, and timid. Its wool is in high estimation, and for this alone thousands are annually killed, various means being employed for their destruction.

The limbs of the vicuña are very slender, the neck swan-like, the forehead broad, the muzzle narrow, the eyes large, and the ears long. The height of the animal at the shoulder is about $2\frac{1}{2}$ feet. As a wool-bearing animal it holds a somewhat similar place to the alpaca, as does the finest short-wool Merino to the best of the long wools.

With respect to the taruga we have no further observations to make.

Such, then, are the animals from which, even in remote antiquity, the Peruvians drew so many benefits, and from the wool of which textile fabrics both of coarse and fine quality were manufactured. Of the latter, some fabrics were the admiration of the Spaniards. As a beast of burden the mule has superseded the llama or guanaco, but its wool is still fabricated into various stuffs ; into ponchos or cloaks, and many other articles. In Kerr's *Collection of Voyages* it is stated that in Chili and

Peru about 80,000 of these animals are killed every year for the sake of their wool, and that their numbers are still kept up. Dr. Ure states, in his work on the cotton manufacture, that among the mummy cloths brought from the ancient tombs of Arica in Peru by Lord Colchester, there are specimens of a sort of worsted stuff made of the wool of the vicuña, so that at a period perhaps long antecedent to the dawn of civilisation on our island, the art of manufacturing cloth had been acquired and was practised by a people whom the old Spanish writers designate by the title of barbarians.

That the attention of Europe was not from the conquest of Peru turned to the wool of the llama tribe is not surprising. Gold was the object of pursuit; for this men, called heroes, endured hardships innumerable, and for this they exercised on the unoffending natives the most revolting barbarities. But the value of the llama wool could not for ever escape notice; it became imported into Europe, where the attention it excited led to attempts, at different times repeated, to naturalize the animals which produced it. We speak not of individuals brought to Europe as curiosities, but of such as have been brought with a better object.

In 1808 a herd of these animals arrived at Cadiz. This herd originally consisted of thirty-six individuals, including the sorts called llamas, alpacas, and vignonias or vicuñas. They were brought from Lima, in Peru, and Concepcion, in Chili, to Buenos Ayres, by slow degrees, the journeys being two or three degrees daily. Their food on the road consisted of potatoes, maize, and hay; but when their supply of potatoes was exhausted they became so constipated that it was necessary to afford them medical relief. Eleven only of the number arrived at Cadiz, and two more died there. These animals were sent to Europe as a present from Godoy, the Prince of Peace, to the Empress Josephine; but they arrived just at the period of his disgrace at the commencement of the Spanish revolution, and the populace, in hatred of their late minister, were about to throw the surviving llamas into the sea. The governor of Cadiz, however, rescued them; and they were given in charge to an eminent Spaniard, Don Francisco de Thérán, who had a fine zoological garden at San Lucar de Barrameda, in Andalusia. The French armies having subsequently traversed this province, Marshal Soult took the llamas under his care, and M. Bory de St. Vincent, a distinguished French naturalist who accompanied the army, studied their habits with great attention, and made some drawings of them, which were afterwards lost at the battle of Vittoria. He paid particular attention to the quality of their wool, and transmitted some specimens of each sort to the Academy of Sciences at Paris. It appears from the report of M. Bory de

St. Vincent and Don Francisco de Thérán, that the fleece of the alpaca-vicuña, that is, a cross between the two animals, has much greater length than that of any other animal and is six times heavier.

Llamas and alpacas have at different times been kept in the menageries of England; as, for example, that of the Zoological Society, and in the private menageries of noblemen; and though they may have occasionally bred no permanent results have ensued. Could these animals be naturalized an important point would no doubt be gained, for large quantities of their wool, and of the yarn spun from it, are imported both into England and France, where it is in great request; and for some purposes it is admirably adapted. It can scarcely be called wool in the restricted sense of that term; it has a silky texture, and is better fitted (if not exclusively so) for the comb than the card. It has been recently called silk-wool, and the title is very appropriate.

The attention of the world at large, but especially of the scientific world, has within the last few years been expressly called to the importance of attempts to naturalize the llama. At the ninth meeting of the British Association for the Advancement of Science, held at Birmingham (1839), the value of the llama silk-wool, and the probability of establishing permanent flocks of the animals, formed an interesting topic of discussion. The subject was introduced by Mr. A. Danson, who, in illustration of his views, exhibited samples of alpaca wools, and manufactured specimens in imitation of silk, and, without dye, as black as jet. Mr. Danson urged that "the animals producing this wool ought to be propagated in England, Ireland, Scotland, and Wales; and stated that to the two latter places the alpaca is well suited, being an inhabitant of the Cordilleras, or mountain district of Peru. Importations of the wool have already taken place to the extent of one million of pounds, and are likely to increase. There are five (?) species of llamas—of these, the alpaca has fine wool from six to twelve inches long, as shown by the specimens exhibited; the llama, coarse long hair; and the vicuña, a very short wool, more of the beaver. The Earl of Derby has propagated the alpaca in his private menagerie at Knowsley; and Mr. Danson understood that Mr. Stevenson, at Oban, in Scotland, has a few of these animals. The wool of these animals would not enter into competition with the wool of the sheep, but rather with silk. It is capable of the finest manufacture, and is especially suited to the fine shawl trade of Paisley, Glasgow, &c. The yarns spun from it are already sent to France in large quantities, at from 6s. to 12s. 6d. per pound; the price of the raw alpaca wool being now 2s. and 2s. 6d. per pound."

Mr. Vigors stated "that one of the objects of the Zoological Society of London was to introduce animals which might be made available for draught, food, or clothing. Amongst others this animal had been kept in the society's gardens. They bred and looked well, but were subject to disease, which was the case with most foreign animals at first." He added, "that the llamas brought forth their young at an unseasonable period, Christmas, but in general animals changed their season of bringing forth in order to adapt it to the climate they lived in."

Whatever may have been the objects of the Zoological Society with regard to the naturalization of animals, it is a fact that notwithstanding the command of large pecuniary resources, and the enjoyment of extensive patronage, the failure has been signal. Not one quadruped, not one bird (and surely the curassows might have been added to our stock of domestic poultry), has been naturalized. Independently of the bad effects of confinement and want of fresh air and exercise, the food is in itself the cause of much mischief. It is difficult to measure the quantity of food, be its quality (which it never is) ever so appropriate, in just proportion to the digestive powers of an animal weakened by confinement in an unnatural atmosphere, and breathing the morbid exhalations of dens, and kennels, and pits all around it. To the case of the llama these remarks peculiarly apply; it is a native of the mountain, inhaling the pure breeze, and there it takes great exercise, the wild flocks exulting in their activity and powers. It is extremely temperate, feeding chiefly on a rushy grass called *ycho*, and that in small quantities; in captivity it is kept for next to nothing. They are fed with wild herbage, a little maize occasionally, and sometimes potatoes. They are not pampered with cut-clover, clover-hay, roots, and biscuits; nor are they allowed quantities of water. Indeed the llama seldom drinks in its native regions, though, as we have seen, the wild herds will sip saline water. They can endure cold, and are expressly fitted in every part of their structure for the mountain range. Their very feet are formed into hook-like claws for scaling the craggy and steep pathways of the rocks. How can we expect such animals to thrive in a flat hot garden in the southern part of England? If the llama or alpaca succeed at all, it will be in the mountains of North Wales (though they may be perhaps too humid), and in the range of the Cheviots and the Grampians. Even there the animals must not be confined, but allowed a large extent of territory over which to wander at liberty. All these points require due consideration; and if the constitution of the animal be such as will not bear change of climate (as is the case with the reindeer), and some modification of food also, no

attempts, however well conducted, will prove ultimately successful. When, however, we remember what man by industry has effected, a few failures should not discourage the adventurer from prosecuting his experiments. It was only by dint of perseverance that the Merino sheep became established at the Cape of Good Hope.

While advocating the naturalization, if possible, of the different llamas, we are not ignorant that a great writer on political economy takes an opposite view of the subject; and though we pay all deference to his opinions (who must not?) we venture with all modesty to differ from him. Had not man attempted the extension of useful animals over every part of the globe capable of supporting them, in what condition would many now flourishing nations have been! Certainly *not* flourishing. Into every country which civilized man appropriates, he introduces the cattle and domestic breeds of his own country; nay, he often, in the purest spirit of general benevolence, introduces them into spots which he leaves on discovering them, such as remote islands, hoping only to benefit the simple aborigines. But it is not only cattle or animals from his own country that the colonizer *should* introduce into his adopted country, for the latter may often be admirably fitted for such as are not extant in his fatherland, that is as domestic animals. We will explain our meaning by what we think a case in point. Australia, or rather our different settlements in Australia, possess, as introduced animals, our own kinds of dog, the horse, the ox, the sheep, the goat, the ass, and of birds our domestic poultry in general; but there is one animal yet (an animal moreover not destitute of value as a wool-bearer) which we conceive might be introduced with the utmost benefit into Australia, and without which its interior will perhaps never be explored. We mean the camel, the patient thirst-enduring ship of the desert, capable of carrying a great weight of necessary provisions, and especially of water for itself and its rider. May it not be that at no distant date a caravan of camels shall periodically traverse the desert between some Australian Bagdad and El Basrah, or wend its way from some Australian Gilead to an Australian Egypt?

However, to return to the llama. It is but fair that we allow Mr. McCulloch to state his own views. "It is (he says) questionable whether the introduction of any new quadrupeds be desirable. We seem to possess the greater number of those that are really essential or even useful to civilized man. By the extirpation of the wild and ferocious inhabitants of our primeval forests, the latter have been converted into pastures supplying food to the horse, ox, and sheep. We neither want the elephant nor the camel as beasts of burden, nor the reindeer for its milk, nor the vicuña for its wool. We derive

all that such animals can supply from others more suited to our climate, and therefore better adapted in every respect for their peculiar purposes. The Rocky Mountain goat, whose wool is superior in texture to the finest Cashmere, might perhaps be introduced, but the cultivated land seems to be already sufficiently supplied with quadrupeds. It is indeed rather ludicrous, so long as its rational inhabitants pay more for bread than any other people, to propose stocking the island with new animals."

We confess at once that *we* do not want either the elephant or the camel; but when the writer acknowledges that a fine-woolled goat might be advantageously introduced, does he not virtually hold the point as regards the llama, so valuable for its wool, an animal which will not trench upon the sheep, nor yet depasture upon cultivated lands, and which indeed requires neither wheat nor barley. Ten thousand llamas would not enhance the price of the wheaten loaf, but they might open a source of employment to thousands, give rise to manufactures of new and valuable fabrics, and call capital to circulation. Why were we at one time desirous of acclimatizing the Merino sheep? had we no sheep of ourselves? and why not on the same grounds, then, had we aimed at the establishment of the Merino in place of the llama? We are obliged to support its wool at considerable cost.

The other animal to which we would allude is the variety of the domestic goat, known as the shawl-goat of Thibet and Cashmir or Cashmere, called *Changrá* by Hodgson,* including its relative the goat of Angora. From the earliest times the hair, or the fine undercoat of the goat, has been used in the manufacture of tissues or textile fabrics, more especially in Eastern Europe and Western Asia. The long-eared Syrian goat, to judge from the specimens we have seen, is only a variety of the Angora breed, having long hair with a fine undercoat like the latter, but perhaps neither so abundant nor so fine. In ancient times, when the goat divided the palm of usefulness with the sheep, the Syrian goat was, we doubt not, superior to what it is now, as far as its hairy produce is concerned; and indeed it appears to us that throughout Asia Minor, Northern Persia, Caubul, Cashmere, Nepál, and Thibet, a long and fine-haired race of goats has existed time immemorial, giving offsets to Scharia, Tartary, Syria, &c., these offsets varying in minor particulars according to climate, locality, and other contingencies. One character they have in common, pendent or semipendent ears, more or less prolonged, and in all the hair falls in long masses, sometimes twisted into spiral ringlets.

* Hodgson describes four varieties of goat in Nepál and Thibet, the Doogoo (central hilly region of Nepál), the Sinal (central hilly region of the Nepál), the Changrá or shawl-goat (Thibet), and Chappoo or Bouc de Cashmere of F. Cuvier (Thibet).

We have abundant testimony of the value of goats' hair, apparently deemed superior to the wool of the sheep in Syria, during the Mosaic period. Among the most valuable contributions demanded of the Israelites for making the tabernacle (*Exod.* xxv.) are "gold, silver, and brass, and blue and purple and scarlet, and fine linen and goats' hair" (cloth). We read (*in Exod.* xxvi. 7), "Thou shalt make curtains of goats' hair, to be a covering upon the tabernacle." We are further informed (*ch.* xxxv.) that every man with whom was found blue and purple, and scarlet, and fine linen, and goats' hair (cloth), brought them, and all the women whose hearts stirred them up in wisdom spun goats' hair. The curtains of goats' hair, eleven in number, were, as we afterwards learn, each thirty cubits in length and four in breadth, a proof that the manufacture of cloth from this material was well understood and extensively carried on.

It would be difficult perhaps to prove it by historic documents, but we have reason to believe that from the time of Moses to the present, throughout those districts of Asia which produced the long-haired breeds of goats, the manufacture of fine fabrics from the hair of this animal has been uninterruptedly kept up.



THIBET GOAT.

The finest breed of shawl-goats is that of Thibet. The Thibet goat is covered with long, fine, falling, silky hair, with an undervest of delicate grayish wool. It is this wool which constitutes the fabric of the celebrated Cashmere shawls. The texture of these shawls is so exquisitely delicate, and their price from various causes so enormous, that some spirited individuals have been zealous in their attempts to introduce into Europe and there naturalize if possible the animal in question. It has been very justly observed that the exorbitant cost of these shawls was occasioned by the distance of the spot where they were manufactured, the countries through which they had to be conveyed, and the high and arbitrary duties paid upon them both by the manufacturer and the persons who undertake their exportation. We learn the

following particulars from a French traveller who succeeded in bringing some of the animals to France.

The wool is first combed from the goat in the mountains of Thibet, where it is sold for nearly five shillings per pound; it is then packed in baskets and sent to Cashmere, where it pays a duty on entry; there it is bleached on rice flour, spun into threads, and taken to the bazaar, where it pays another tax. The thread has next to be dyed; it is then woven, the border is afterwards sewed on. Instead of now selling his article to the best advantage, the weaver is constrained to carry it to the custom-house, where the collector puts upon it what amount of duty he pleases, and is only restrained in his demand by the fear of ruining the weaver, driving him from his business, and thereby losing future profit for himself. Here the shawls are sold, those intended for Europe are packed up and sent across the Indus to Peshawer. This part of the journey is toilsome and expensive, the packages are generally carried on men's backs, for the road is in many parts impassable even for mules, being across deep precipices which must be traversed by means of swinging bridges of ropes; and up almost perpendicular cliffs, which must be scaled by means of wooden ladders. At each station during this long journey, which lasts about twenty days, a tax is paid, generally arbitrary, and on the whole amounting to two pounds sterling. The confines of Europe are still distant; there are other imposts at various stations to be paid; but beyond all this, the merchant is in danger of losing his stock, the marauding tribes of Afghanistan being ever on the watch, and the country generally in a state of anarchy. When he passes through Caubul, and enters Northern Persia, he is liable to be pillaged by the Turkomans and Kirghiz, whose forbearance he must purchase often at a high price. He now enters Turkey in Asia, and at several places sells his merchandize. Many of the shawls find their way to Europe by way of the Caucasus through Russia, but the greater number reach Constantinople, and are then a long way from the great cities of Europe, in which they are to be displayed for sale to the opulent. What amount of profit and interest upon capital the European merchant or shawl-dealer puts upon his merchandize, we pretend not even to guess at.

From time to time single specimens of the shawl-goat, or rather as we think of some of the inferior Tartar breeds, reached Europe, for exhibition in menageries, but it must be evident that from a flock only could any definite results be experienced; yet at the same time the safe transport of a flock from Thibet to Western Europe, appeared to be a difficulty not to be overcome. The French government was however

interested in the subject, and inquiries were instituted as to the possibility of obtaining a flock from some of the wandering tribes, who in their migrations sometimes touch upon the confines of Thibet, and retrace their course through the steppes of Asiatic Russia. Persons were accordingly sent to the fair of Macarief (since removed to Nijnei Novogorod) to make inquiries of the Asiatic merchants who annually assembled at that great mart, and there they learned that flocks of Thibet goats were numerous in the steppes of Russia. Circumstances however interfered to prevent the affair from being carried forward; but the information gained proved very serviceable in directing an expedition which was fitted out some years afterwards, for the express purpose of bringing back these shawl-goats.

It was in April, 1818, that M. Jaubert left Paris as chief of the expedition; and from his knowledge of the Turkish language and character he was peculiarly fitted for travelling through countries peopled by Turkish tribes. He proceeded towards Asia, through Southern Russia, by Odessa, Taganrog, and Astrakhan. As he continued his course he received much information from merchants of Bucharia and Armenia, and ascertained that a handsome race of goats with brilliant white fleeces was to be found among the Kirghiz tribes, who wander in the plains which are partially surrounded by the great bend of the river Ural, or Yaik, dividing Europe from Asia. Samples of the down from these animals were shown him, and he found locks of it scattered here and there in the steppes between Astrakhan and Orenburgh, which convinced him that he was on the track of the genuine shawl-goat. This idea was further corroborated by the designation of *Thibet*, the name applied to this goat by the native tribes, viz. the Kirghiz, in whose possession he found large flocks of these animals. He effected a purchase of 1,300, and then prepared to retrace his journey, but unfortunately at an injudicious time, viz. the setting in of winter. The goats crossed the Volga at Tsaritsin, about 300 miles above Astrakhan, and thence proceeded to Taganrog, on the Sea of Azoph, where it was intended to embark them; but, as might have been anticipated, the sea was frozen, and it was found necessary to drive them on to Caffa, which they reached on the 24th of December, nearly 300 of their number having died on the way of fatigue.

At Caffa the flock was divided into two portions; of these, one consisting of 566 goats was put on board a Russian vessel, which arrived at Marseilles about the middle of April, 1819. The other portion with M. Jaubert himself embarked on board another vessel, and arrived at Toulon at the end of the same month.

With respect to this latter portion of the flock

we know little definitely respecting its future history, but with respect to the portion that landed at Marseilles, and which was consigned to the care of M. Tessier, we have tolerably ample details.

And here we would remark that after all it was not the genuine Thibet breed which M. Jaubert procured, but only the Kirghiz variety of it, of which the wool most probably would have sold in Cashmere at a lower rate, for it is the Thibet race that is there so much valued by the shawl weavers. This indeed was the opinion of Mr. Moorcroft, who, in a letter written in the beginning of 1822 at Ladakh in Thibet, says, "France has, I learn, procured a flock from some of the steppes near the Caspian, which must be inferior to those of Thibet, as lately Aga Aabdi was employed by Russia itself to procure the breed from the borders of Chinese Turkestan."

However, the flock received by M. Tessier were placed, on landing, in the lazaretto, and foolishly subjected to quarantine regulations. They were in a miserable condition, having been packed together in the hold of a Russian vessel, with no room to move about, and no fresh air; nor did the lazaretto improve their condition. They were dreadfully diseased; the hair fell off them, numbers suffered from convulsions, and numbers perished from tubercular consumption. A remnant of the flock alone remained, indeed the united number out of both flocks that survived was not above 400. Of these some were placed in the royal bergerie near Perpignan, at the foot of the Pyrenees, some in the hilly country about Toulon, and others farther to the west, in the departments near the Rhone. By degrees they regained their health, and by August the hair had grown to a considerable length, and the coat of under-wool to make its appearance.

The shawl-goat might now be considered as naturalized, but great was the disappointment which ensued, when it was found that no more than about three ounces could be procured from each animal. All hope of profit from the rearing of such animals was out of the question. Was the defect in this particular breed, or is it peculiar to the Thibet stock also? if it be so, the expense of the Thibet wool in Cashmere is easily accounted for; but this is a point not proved.

The whole scheme now seemed a failure, but fortunately some Angora goats had just then arrived in France, one of which in 1822 was seen by M. Polonceau, proprietor of several of the Kirghiz-Thibet goats. The length and silkiness of its hair were extraordinary, and in a happy moment it struck this gentleman that a cross between the two races might produce a race superior to either. The experiment was tried, and succeeded even beyond hope. Instead of the trifling quantity of three ounces, several of the

mixed race furnished thirty ounces of down in one season, and the average produce of the flock was above sixteen ounces each animal. In addition to this, while the down preserved its original softness and peculiar delicacy, it became finer and longer in the staple, and of a more silky quality. The mixed breed moreover was more robust, more gentle, as manageable as the sheep, yet at the same time active, and capable of seeking its food in the most rocky situations.

It must not be supposed that nothing was attempted in England. A spirited attempt was made to acclimatize the Thibet goat by Mr. Towers, and a flock of the unmixed breed, procured in France, was located in 1824 at Weald Hall, in Essex, where it rapidly increased, and in every respect resembled its parents. In 1828 three shawls were made at Paisley of the wool of Mr. Towers' flock, and one of these was presented to Queen Adelaide. They were judged by a committee of manufacturers to be superior to any brought from France. Unfortunately ten goats, each yielding three ounces of down, were required to furnish material sufficient for a shawl of a yard and a-half square. Attention, therefore, was directed to the Angora-Thibet, or mixed breed, established in France; but we cannot learn that any permanent results have followed the experiments undertaken. Nor do we think that in our country it will ever be worth while to keep flocks of shawl-goats on anything like an extensive scale.

At this time our Australian colonies were largely and earnestly engaged in the growth of wool; and the improvements which had been produced in the fleeces of sheep exported thither, naturally excited a desire in men of enterprise to avail themselves of every opportunity of increasing the importance of their settlement. In 1828 Mr. Riley, a proprietor of New South Wales, saw at St. Ouen M. Ternaux's flocks of pure Thibet goats, but he was deterred from purchasing by the small weight of their available fleece, which would, after the expenses of so long a voyage, return no profit. He then visited the crossed race of M. Polonceau, at Versailles, and was anxious to purchase as many as possible; but M. Polonceau being anxious to increase his stock, and to conduct his experiments on a still larger scale, declined all offers of purchase, and Mr. Riley was disappointed. At the close of 1831 he again returned from New South Wales to Europe, and paid M. Polonceau another visit. He found the stock greatly increased, and with all its good qualities undiminished. He prevailed on M. Polonceau to sell him ten females and three males, all of which he conveyed to London. In 1832 (March) Mr. Riley addressed a letter (dated London) to the Society of Arts, stating his success. Some of his females had produced young, and he was then carefully

preparing for his voyage. He received the gold medal of the society for his meritorious endeavours.

To what extent the attempt to naturalize the shawl-goat in Australia has succeeded, we are not able to say, nor can we learn that any of its wool has been imported to Europe.

In our hemisphere, whether in Tartary or France, the shawl-goat begins to acquire its undercoat of down in September, as a provision against the winter, and sheds it spontaneously in March. In New South Wales our winter months are the summer months, and it would be curious to know what modification in the growth of this material would take place so as to fit the animal for its new residence. Would any alteration as to time take place in the case of the first comers? and if so, would it be at once, or gradually after a few seasons? How, in the case of the sheep, did the converse of the seasons at first operate? It is a subject which no one seems to have investigated.

With respect to the naturalization of the Rocky Mountain goat (*Rupicapra Americana*) of the wild district in North America so named, we confess we consider it as out of all question.

In a work expressly devoted to the sheep, a notice of the llama and the shawl-goat may be deemed somewhat out of place. When, however, the position of these animals, relative to the sheep, as far as their wool is concerned, is considered, we trust that our readers will absolve us from a slight deviation from the hacknied road, which writers on such subjects are apt to pursue. Indeed, in order that we may fairly appreciate the

sheep, it is necessary that we should sketch an outline of those wool-bearing animals whose produce is so highly esteemed, and which are regarded by many as deserving of naturalization in our island. Our own opinion is, that their naturalization will never be achieved. They are formed for the countries they inhabit, and there require no trouble and no expense; on the other hand, we say, could they be naturalized (and this more particularly with regard to the llama), an advantage would be gained. Let us suppose that they were so, how would the sheep be affected? Not in the smallest possible degree. The silk wool of the llama is fitted only for exclusive purposes; and as for the shawl-goat, what farmer would ever dream of rearing flocks merely for the sake of a few ounces of wool yearly from each individual (let its price be ever so high), the carcase of the animal being utterly worthless, except for feeding a kennel of hounds. In this point the llama stands in the same predicament. Yet we think that the wool of the llama, taking all things into consideration, and especially the slender diet upon which the animal subsists, would remunerate the possessor. In the meantime, the practical farmer is content with his sheep, and it will be long before the experiments of noblemen, carried on for their amusement, will force an animal upon him with the nature of which he is utterly unacquainted. Let us not be mistaken. We do not depreciate such experiments, but in the course of events it must be long, very long before we see the herds of llamas bounding over the mountains of North Wales—nay, will it ever be so? Who can tell?

CHAPTER XI.

GENERAL MANAGEMENT OF SHEEP.

LET us now pass from the wool of the sheep, and of that of its rivals, once more to the domestic sheep itself; and here we would speak more particularly with respect to its general management.

The routine to be followed by a farmer in the feeding of his sheep depends entirely upon the character of his ground, and the breed he cultivates. There are, however, few localities in which turnip husbandry cannot be carried on. Light soils will yield the common white turnip, while the richer, heavier, and more nutritious Swede will, on stiffer ground, produce a valuable crop. Of the importance of guano, as a manure for turnips, we need not here speak; we have noticed it in our history of the Ox. The turnip system supposes what is called "artificial feeding,"

that is, a plan of feeding on vegetable productions sown expressly for that purpose. Of these productions the turnip is most deserving of notice. The crop of this root not only supplies abundance of winter nutriment, and by its very culture clears the ground; but beyond this, the depasturing of the sheep upon it leads to the preparation of the soil for other crops in the most economical manner. The sheep farmer who has land under turnip cultivation, should, if possible, have at least two relays of flocks; first, his *fattening sheep*—these should be penned day after day on fresh patches (not without a little salt to lick), and allowed to pick and choose for themselves; on this plan they thrive better than if the roots were dug up and given to them in any other sort of enclosure; perhaps the little quantity of earth which they

take into the stomach may act beneficially, and as a corrective against the production of acid and gas: secondly, *store sheep*—after the fattening sheep have been removed from a patch of land, these may be hurdled upon it, and will clear it effectually, while, with their predecessors, they return good service to the farmer in the shape of manure.

In addition to turnips we may here observe it will be found, in the long run, advantageous to give a daily portion of oil-cake, &c., notwithstanding the expense of purchasing, for not only will it make the crop of turnips last longer, but tend to enrich the soil far more than if turnips alone be given as food. It is a cheap and easy way of manuring the land, and positively repays the farmer. The sheep, moreover, thrive better, and are sooner ready for the market. By a constant attention to the equal distribution of a flock, fed upon turnips and supplied with a certain quantity of oil-cake daily—an artificial food, as it has been called—the best results may be expected.

By the use, says Mr. Robert Smith, of artificial food, the vegetable produce is much economized, the animal is kept longer upon the land, and becomes more healthy and less liable to disease.

"This result," he adds, "I fully proved by an experiment in the year 1836. On the 29th of October, part of a field of Swedish turnips was measured off, amounting to eight acres, and eighty wether lambs and eighty ewe lambs were placed upon them in separate pens—the wether lambs commencing on one side, and the ewe lambs on the other. Each lot was penned across the land, so that there might be no difference in the crop on after management. The wether lambs were allowed each half-a-pound of oil-cake per day, during the winter. The ewe lambs were kept entirely upon turnips; each lot had the turnips cut for them, and when the roots were all consumed, the lambs met. The land was again measured, and the ewe lambs were found to have eaten 4A. 0R. 32P. of turnips; the wether lambs 3A. 3R. 8P.; thus showing a gain of 1R. 24P. of turnips by the use of artificial food, and longer duration upon the land. The field had been highly manured upon the ridge system for the turnip crop, which, by calculation, after weighing 22 square yards in an average part of the field, was estimated at 22½ tons per acre. When the lamb-hogs were placed upon the turnips, ten average lambs of each lot were weighed and marked, and again weighed every month during the time they remained upon the turnips, which proved to be 16 weeks 2 days. Having no opportunity of weighing the turnips daily to the respective lots, a calculation was made, and it showed the ewe lambs to have eaten upon an average 22½ lbs., and the wether lambs 20¼ lbs. of turnips

each per day. The average gain of the ten ewe lambs, during the time, proved to be 28½ lbs., and of the ten wether lambs 36¼ lbs. each. The eight acres were sown with Chevalier barley and mixed clover seeds in the spring, and each part harvested and threshed separately. They were found to produce—the 4A. 0R. 32P.—25 quarters 1 bushel, or nearly 6 quarters per acre; the 3A. 3R. 8P., 25 quarters 6½ bushels, or 6 quarters 6½ bushels per acre. The young seeds upon the latter looked weaker up to the following May, but this I attribute to the heavy crop of barley. The whole piece was grazed during the summer, when the part fed off with the wether lambs recovered, and was by far the strongest and best crop. The following March the land was sown with Friesland oats, but which were not threshed separately, the apparent result being so decidedly in favour of the part eaten off by the wether lambs."

To revert, however, to the turnip as food for sheep. It must be confessed that in some years, from various causes (as the fly, *Haltica nemorum*, and one or two allied species), the turnip crop is liable to a failure; and, under these circumstances, the farmer who has trusted to his turnip crop is distressed to find food for his sheep. Against mishaps of this kind we know of no remedy. Formerly the agriculturist would have found a succedaneum in the potato; but the failure of the potato crop, not only recently, but more or less for the last three or four years, owing to some ill-understood disease which attacks the tuber, renders the farmer's dependance upon this resource too uncertain. Could the farmer foresee a failure in turnips he would most likely cultivate a sufficiency of mangel-wurzel, though this would be at the expense of deteriorating his land. On this root, and on hay, the fattening flock might be well managed, but without profit; for not only will their manuring of the land be lost, but the land on which the mangel-wurzel is grown will require preparation for another crop, be it what it may, and the hay might be used for other purposes. Besides, with respect to mangel-wurzel, although it increases the milk of the ewes, and fattens the sheep, still if given largely at once (the animals feeding voraciously), it is apt to produce sickness, and a sort of surfeit, attended by a falling off of the wool in flakes, more especially in ewes at the lambing-time, or with young lambs, unable to drain the preternaturally distended dugs of their mothers, fed upon this rich, saccharine, succulent root.* A little good management of course

* Some breeders are loud in their praise of mangel-wurzel from its succulency, its abundance of saccharine matter, and its powers of increasing the flow of milk, so essential to the lamb. On the other hand, Mr. H. S. Thompson says, "After trying mangel for four successive years, I came to the conclusion that cows fed on it gave quite as much milk, but much less butter and cream than when fed on turnips or carrots; also that when the

obviates all this danger; still it is right to notice it. Let dry food, such as hay, be given largely at first with mangel-wurzel, and the proportions of the latter increased gradually. However, as we have said, this is not the way in which fattening sheep will return a fair profit. We are speaking of an expedient to which the farmer may have to resort, and not to the broad outline of his system.

To revert to potatoes. Granting that the crops will be in future years what they once were (and we devoutly hope that it may be so), we decidedly recommend that they be steamed or boiled (if given raw, sliced of course), but steamed if possible. Our own experience has proved to us that steamed potatoes are better by twenty per cent. for sheep and other cattle than when raw. The difficulty is, how can this steaming or boiling be managed. A farmer has a good flock of sheep. He cannot go to the expense that some of our noble agriculturists encounter without a moment's hesitation. They have their buildings all fitted up in perfection; they can afford the outlay; but how can the plain farmer, renting his two, three, four, or five hundred acres, afford it. Can it not be managed? We think not. A farmer's expenses are not light, and he has no money to throw away. It is not in every district that the seams of coal are available, and when this is not the case fuel is dear. We mention this, because when speaking on this very subject to a valued friend—a practical farmer—and on proving to him, as we thought, how a steam apparatus for roots in general would pay, he said, "You come from the coal districts, and forget that I live where our common fuel is wood; and where coal is very dear, and wood in proportion. Try and feed 200 sheep on your plan, and then count your gains."

To revert to mangel-wurzel and potatoes. They should be sliced, and given in troughs, and not strewed on the ground; besides these roots, peas, barley meal, ground corn, or green corn, oil-cake, &c., are among the articles of food resorted to, according to the convenience of the farmer. With respect to the Southdown sheep, the routine of artificial food is, generally speaking, as follows:—Early in spring, and about, or soon after lambing-time, green rye will be in; but this should be given sparingly, otherwise it is apt to produce fatal diarrhoea. On this account it is unwise to fold the ewes on the rye during the night; and even during the day it is the safest plan to turn them off the rye, for a few hours, upon

good old pasture land, where they will have a change of diet; and indeed, if they pick but little there, no matter, for time will be given for the digestive organs to perfect their work—a point, in feeding upon all artificial grasses, to be kept in remembrance.

The rye will usually last till the latter part of May, when the ground is ploughed up for a crop of turnips or rape. To the rye succeeds Rye-grass (*Lolium perenne*), which when young and tender is a favourite with sheep; it will afford food to the latter end of June; and afterwards, successive crops of winter tares will come in. We must suppose that these tares are sown in patches, not all at one time, but in succession (*ratione ad usum habitâ*) from the beginning of October to the beginning of the May following. By this mode of proceeding, crop after crop becomes available, till tares, clover, or rape take their turn. Which of these latter grasses the farmer must cultivate will be determined by the soil and situation of his farm; clover should perhaps have the preference, *cæteris paribus*; some may prefer rape.

Now comes on the winter supply—the turnip crop. As we have already said, the common white field turnip will thrive on light soils; but the Swedish is most advantageous on land adapted to it. The latter is the most nutritious by about 20 per cent; and the larger and finer the root, the greater proportion of nutriment does it yield; on the contrary, in other turnips the moderately sized roots afford a greater quantity of nutrition than those which are overgrown. Huge spongy roots of white field turnips are very inferior. While feeding on turnips, let the farmer beware of *hoove*, or distention of the stomach with gas. Sheep should not be suddenly turned from a poor dry pasture to a field of these succulent and nutritious articles of diet. A gradual accommodation of the digestive powers to this rich food is advisable.

The Southdowns, as we have previously observed, are admirable folders, and bear the necessary travel well. Not so the Leicesters, or long-woolled sheep generally, and indeed with these the system of folding is rarely adopted, for neither will the nature of the sheep, nor the size of the farms, as a general rule, allow of this practice. The farmer feeds, as it were, by hand; he does not drive his flock to any distance. The general routine with respect to a flock of Leicesters has been thus succinctly and admirably portrayed:—"The ewes will approach their time of yearning about the beginning or middle of March; and this being often an inclement season, and the Leicesters requiring more attention than the hardier kind of sheep, the ewes that are coming into the last week of pregnancy should be separated from the others, according to their numbers, and brought nearer home, that

ewes were fed on mangel-wurzel, the lambs thrived remarkably ill, which I attributed to the same poverty of milk which had been proved in the case of the cows. The kind was the orange-globe; the roots, large and perfectly sound, were not used till after Christmas, and were grown on land of rather weak staple, but what is termed hereabouts good sand land."—*Farmer's Magazine*, 1847, p. 149.

they may be put into a yard at night, constructed for this purpose, having a good shed in it, and being well protected from the cold wind. They should have a plentiful supply of turnips, ox-cabbage, &c. The greatest attention should be paid them at this time, and the shepherd should be with them as much as his other duties will permit. If it is a peculiarly valuable flock the shepherd should sleep on the premises, for the Leicester ewes are more liable to require assistance when yearning than any other sheep are. The lambs are generally large, and the ewes fat, and so a double difficulty occurs.

The lambs are kept up for a few nights, leaving them out with the mothers in the day-time. They should be castrated when about a fortnight old; but a fine dry day should be selected, and they should be kept up for two or three nights afterwards. They should likewise be tailed at the same time. The lambs remain with their mothers till the beginning or middle of July; they are then weaned and turned into good pasture of seeds or grass, until the latter end of October, when they are put upon turnips, sometimes the common turnips first and afterwards the Swedes, but they do better upon turf provided it is to be had, a few turnips being drawn for them when the weather is severe. The ewes remain on ordinary pasture, which will probably bear from seven to eight per acre, until two or three weeks before the admission of the ram, when they should be changed into good pasture, upon well known principles. The ewes continue on the old pastures from the time the rams are removed until the end of November, when they are sometimes hurdled upon turnips, the fattening sheep having been penned upon them first, and the ewes following to make clean work.

"The lambs are seldom shorn until the second year, when the fleece will weigh between seven and eight pounds, the length of the staple being from ten to twelve inches. The aged ewes yield from five and a half to six pounds of wool. The usual time of shearing the store sheep is from the beginning to the middle or end of June. Sometimes however they are shorn in May, and yield each from 7 lbs. to 9 lbs. of wool. The washing usually takes place in the last week in May, after which the sheep are sent into clean pastures for a week or a fortnight before they are shorn. Some farmers permit a longer time to elapse, in order to allow the yolk to rise into the wool; this makes it weigh heavier, and also work better in the manufacturing process. The yearling wethers are generally separated from the theaves (*gimmers* or ewes that have been once sheared) at the time of shearing, and they are put upon good keep, most frequently upon seeds. The theaves run upon the common pasture until the ewes go

to better keep, previously to the admission of the ram. The wethers are generally kept on turnips, and sold in the early part of the following spring. On large and well conducted farms, they have a rack in the field, well supplied with coarse hay or straw, and a trough is fixed under the rack, containing common or rock salt."

The ewes go with the ram from the beginning of October to the second week in November; one ram is the lord of about sixty or even eighty ewes; but a successor in his place is desirable, in order that the farmer may not be disappointed in his fall of lambs. His own observation must be here his guide—we need not enter into minutiae.

Now with respect to ordinary pasture land. It is almost needless to say, that, with the exception of hay or a few turnips in winter, sheep in many districts are kept entirely on the natural grazing ground. And here two points are material—first, the non-overstocking of the ground. It is a better plan to parcel out the sheep into small flocks, and keep them in adequately sized enclosures, than to throw them together, and drive them to different parts of an extensive sheep farm; they do not settle down readily and quietly in new localities, and to drive them backwards and forwards is only to tease them. In an enclosed country, therefore, sheep will thrive the best on grass land partitioned off into enclosures of moderate size, the number of sheep being determined by the size of the enclosure; here they become contented, fatten kindly, and benefit the land. Secondly, the nature of the grass produce on which the sheep are depastured. Different lands produce different grasses; some grasses are fitted for meadow lands, some for permanent pasture grounds, and some are best fitted for the hills and uplands. A farmer often judges alone by the weight of grass a certain enclosure yields, irrespective of its comparative nutritive qualities, or of the predilection of the sheep for any particular sort. The various grasses not only differ as to their time of flowering and seeding, but as to the quantity of nutritive matter contained in a given volume; and not only so, but this proportionate quantity differs at various seasons of the year, according to the condition of the grass. These are points which, although too often neglected by the farmer, ought to attract his serious attention; inasmuch as there is and must be an intimate connexion between the nutritive quality of the food, and the health and thriving condition of the sheep. It may be moreover that different breeds have their peculiar favourites—and this circumstance, as far as experience guides us, should be taken into consideration; for it must stand to reason, that sheep will not prosper on a pasturage towards the grass of which they have an aversion.

To notice a few of the principal grasses which tend to compose our pasture lands may be not out of place, their respective bearing upon the nutrition of the sheep being duly borne in mind:—

1. The sweet-scented vernal grass (*Anthoxanthum odoratum*). This species (*Diandria Digynia*, Linn.) is a true and permanent meadow grass, suited to most soils, and flowering early. It is not, however, much relished by sheep, who prefer the meadow fox-tail, a species of *Alopecurus*, with other grasses, and indeed will not touch it if this or the white clover can be obtained.

2. Meadow fox-tail grass (*Alopecurus pratensis*). This grass (*Triandria Digynia*, Linn.), one of several allied species, flowers about the middle of May, the seeds being ripened in June. On a clayey loamy soil, at the time of flowering, it will produce about 20,418 lbs. per acre, every half-pound yielding $1\frac{1}{2}$ drachm of nutritive matter. When the seed is ripe, the produce per acre is reduced to 13,000 lbs., but the nutritive principles are doubled. The aftermath yields about 8,000 lbs. per acre in favourable seasons, the nutritive matter being 2 drachms to the half-pound. This grass is disliked by horned cattle; horses however eat it without repugnance, but sheep are partial to it.

3. Smooth-stalked meadow grass (*Poa pratensis*). The genus *Poa* (*Triandria Digynia*, Linn.) is rich in species, but they are not great favourites with sheep. This species is one of our early grasses, but is said to exhaust meadow lands upon which it prevails.

4. Short blue meadow grass (*Poa humilis*). This species is chiefly peculiar to mountain or at least hilly pastures, and dry peaty lands; it is eaten by sheep, and is tolerably nutritious, but affords nothing that can be called a productive crop.

5. Rough-stalked meadow grass (*Poa trivialis*). Unlike the former species, this grass scarcely flourishes on hilly and exposed grounds; there it soon pines and disappears, but in rich low sheltered meadows it luxuriates abundantly, and forms a valuable crop. Sheep delight to feed upon it, and it is highly nutritious. It flowers in the second or third week in June, and the seeds ripen by about the second week in July. The produce of this grass, at flowering time, per acre, has been calculated at about 7,500 lbs., the proportion of the nutritive matter being then about 2 drachms to the half-pound. But at seed-time it still improves; at the time of flowering the stalks or culms are weak and tender, but, contrary to the general rule, at seed-time not only do the culms become firm, but they lose no succulency; hence at the period of ripening the produce per acre may be calculated to average 7,800 lbs. per acre, each

half-pound yielding $2\frac{3}{4}$ drachms of nutritive matter. Thus, then, this grass is highly valuable. Meadows abounding with it may be mown late (and how often is the work of the scythe stopped in our changeable climate at the usual time) even with advantage; for it will compensate for some deficiency in the other grasses. An instance of this nature has just come under our notice. A field of meadow grass was mowed in the middle of July; we too hastily blamed the owner, but we found the principal grass of his meadow to consist of the *Poa trivialis*. The hay was sadly deficient in that fine scent which the sweet-scented meadow grass so powerfully exhales on drying, but it was good hay notwithstanding, and he wisely mixed it with lucern, sainfoin, and trefoil hay. The narrow-leaved meadow grass is either a variety or a closely allied species.

6. Sheep's fescue grass (*Festuca ovina*). This grass (*Triandria Digynia*, Linn.) is a native of dry pastures and hilly districts, and is exceedingly acceptable to sheep. It yields no crop, nor would it appear to be extremely nutritious (let us be cautious respecting the analytic experiments of chemists); nevertheless, we are told by Linnæus that hills destitute of it are of little value for sheep-feeding, and Gmelin (*Flora Siberica*) assures us that the Tartars fix upon the spots where this grass grows in abundance for their summer pasturing grounds, as they consider it extremely wholesome. Not only are sheep excessively fond of it, but they thrive upon it, and its soft foliage is peculiarly adapted to their close bite. The grasses of this genus are numerous (see Withering, Knapp, Hull, &c. &c.)

Welsh fescue grass (*Festuca Cambrica*, var. of *F. duriuscula vel repens*, Knapp). This grass is peculiar to high pastures, and is most agreeable to sheep, while at the same time they thrive upon it.

7. Round-headed or rough cock's-foot grass (*Dactyles glomerata*). A meadow grass (*Triandria Digynia*, Linn.) valuable for permanent pasture, and affording a good succulent aftermath. It is relished by sheep, and is very nutritious, resembling in its peculiarities the *Poa trivialis*.

8. Hard fescue grass (*Festuca duriuscula*). This is a short grass, delighting in good natural pastures, where the soil is rich but light and dry. Few among the dwarf-growing grasses are more acceptable to sheep, and its nutritive properties are at a fair ratio; nor is the crop light when we consider it as a short grass. It flowers about the beginning of July, and will then yield near a ton per acre, the half-pound giving $3\frac{1}{2}$ drachms of nutritive matter. At seed time, which occurs about the end of July, the weight of the crop per acre will be somewhat greater, but the nutritive qualities of the

grass will be greatly diminished. It is decidedly in its prime during the flowering season.

8. Meadow fescue grass (*Festuca pratensis*). In all moist rich meadows this grass constitutes a considerable and most important portion of the herbage. As a hay-grass it is very valuable, and is a favourite with cattle; nevertheless, sheep are not particularly partial to it. It flowers at the end of June or beginning of July, and the seed is ripe at the close of the latter month. Its produce at flowering time will average three-quarters of a ton per acre, and the half-pound is estimated to produce upwards of four drachms of nutritive matter. At the end of July, the produce per acre is about a ton; but, then, the nutritive qualities of the grass have so much decreased, that the half-pound yields scarcely a drachm and a half of real nourishment. As is the case with the hard fescue grass, it is far more valuable at the beginning than at the end of July, although the weight per acre may be at the latter season somewhat augmented.

9. Rye grass (*Lolium perenne*). The rye grass, or perennial darnel, belongs to the *Triandria Digynia* of Linnæus. It is a pasture grass, with some varieties. When in the early stage of its growth, sheep are very partial to it; but when, about midsummer, the seed begins to ripen, they almost entirely neglect it. An experiment has been tried at Woburn in the following manner:—A field was laid down in two equal parts; on one portion were sown rye grass and white clover, on the other cock's-foot grass and red clover. From the spring until midsummer the sheep depastured almost exclusively on the rye grass, but after that time they retired from it, and during the remainder of the season adhered with the same constancy to the cock's-foot grass. Rye grass certainly exhausts the soil; but it is a valuable product, and is available to the end of July, being equally good both in the flowering and seed season.

10. Crested dog-tail grass (*Cynosurus cristatus*). This grass is a native of dry pastures, such as the Downs; and on it the Southdown sheep feed with avidity, preferring it to most others. The Welsh sheep, on the contrary, are said to neglect it, preferring almost any other species. This diversity in the taste of sheep is very singular; and in the selection of breeds for his pasturage, the farmer may take advantage of the circumstance, although we believe that the whole of this preference results from habit.

11. Yellow oat grass (*Avena flavescens*), a pasture grass generally found in dry situations, and flourishing where calcareous land-dressing is used. It is a favourite food of sheep.

12. Common Timothy grass or meadow cat's-tail grass (*Phleum pratense*). This is a first-rate hay-grass for sheep, and should be cut about the middle or towards the latter end of June, when in

flower. The seed ripens at the end of July. Mixed with other grasses, this species contributes to form an excellent pasture-ground, and on hay meadows, after being cut, returns an excellent aftermath.

13. Bents (*Agrostis*). The species of bent are rather numerous, but none are of any importance as food for cattle, although the sheep in Wales are said to be extremely partial to the common bent (*Agrostis vulgaris*); and it is eaten by mountain sheep generally.

We might enumerate many other grasses, as hair grass (*Aira*), Melic grass (*Melica*), cotton grass (*Eriophorum*); but as they are valueless so far as the feeding of sheep is concerned, we need not particularly notice them.

The following extract from Mr. Robert Smith's Prize Essay on the management of the sheep may be here well introduced, and cannot fail to be acceptable:—

"Having determined (he says) upon a series of experiments for my private information, and being desirous to ascertain the best and most economical plan to produce good animals (and having subsequently confirmed the greater part of them), I proceed to give them at full.

"*Experiment No. 1.* On the 20th of December 1842, eight lambs were weighed and placed upon the regular turnip land (a red loam with cold subsoil) to consume the turnips where they grew, and were regularly supplied with what cut Swedes they would eat, which proved to be on an average 23½ lbs. per day. They were again weighed on the 3rd of April, 1843, being fifteen weeks, and were found to have gained upon an average during the time, 25½ lbs. each.

"No. 2. On the same day, eight lambs were placed in a grass paddock under the same regulations, and found to have consumed on an average 19 lbs. of turnips per day, and to have gained during the time 26¾ lbs. each.

"No. 3. On the same day eight lambs were placed alongside the No. 2 lot in the grass paddock, and allowed to run in and out of an open shed during the day, but regularly shut up at night. They were allowed half-a-pound of mixed oil-cake and peas each per day; and they consumed 20½ lbs. of turnips per day. They gained 33½ lbs. each.

"No. 4. On the same day, eight lambs were placed with the Nos. 2 and 3 lots in the grass paddock, under the same regulations as No. 3, but supplied with 1 lb. of mixed corn per day. They consumed 20 lbs. of turnips per day during the following ten weeks, being again weighed on the 28th of February, 1843, and gained on an average 26½ lbs. each.

"No. 5. Eight lambs were also placed in a warm paddock, with a shed to run under during the middle of the day, but were shut up at least

eighteen hours. They fed upon $1\frac{1}{4}$ lbs. mixed corn per day, and consumed $18\frac{1}{2}$ lbs. of turnips per day. They were again weighed at the same time as No. 4, and found to have gained $33\frac{1}{2}$ lbs. each during the ten weeks.

"No. 6. On the 5th of January, 1843, sixteen shearlings were equally divided, and placed eight upon a grass paddock, and allowed 1 lb. of mixed corn each per day. They consumed 24 lbs. of Swedish turnips each per day. They were again weighed on the 2nd of March, being eight weeks, and found to have gained $21\frac{1}{2}$ lbs. each.

"No. 7. On the same day the other eight shearlings were placed alongside the No. 6 in the grass paddock, and allowed 1 lb. of mixed corn each, and consumed $20\frac{1}{2}$ lbs. of turnips per day. They were allowed an open shed to run under during the day, and regularly shut in at night. They were again weighed at the same time as No. 6, and were found to have gained 24 lbs. each during the eight weeks.

"No. 8. On the 3rd of April, the eight lambs, No. 3, having been weighed, were placed upon young clover, and supplied with half-a-pound of mixed corn, as before. They consumed 12 lbs. of turnips per day during the following month. Being again weighed on the 1st of May, they were found to have gained $11\frac{3}{4}$ lbs. each. They had a shed to run under during the day, and were shut up at night.

"No. 9. On the 29th of May, the eight lambs, No. 8, were again weighed, having been allowed as before half-a-pound of corn upon the clover, but no turnips, with a shed to run under at will. They were found to have gained 16 lbs. during the month.

"To prove the temperature of the animal body during the hot weather, I placed the two lots of shearlings, No. 6 and No. 7, upon moderate clover, on the 1st of July, 1843.

"No. 10. The eight shearlings, No. 6, were weighed, and allowed one pint of peas per day; they were again weighed at the end of twenty-one days, and were found to have gained $9\frac{1}{2}$ lbs. each.

"No. 11. The eight shearlings, No. 7, were also weighed, and given one pint of old beans per day; and were found to have gained 6 lbs. each; the peas appearing most suitable to the animal temperature during the hot weather, and the beans far too hot. What is more important, those sheep fed upon beans were getting full of humours in this short space of time, while those fed upon peas were looking exceedingly healthy.

"In the autumn of 1843, after making the above experiments, I determined upon testing the qualities of various vegetables open to our use at that season of the year. On the 2nd of October, 1843, thirty lambs were equally divided into lots of ten each, and placed upon over-eaten seeds;

they were all weighed, and the roots were regularly given them by an experienced shepherd.

"No. 12. Ten lambs fed upon cut white turnips were again weighed on the 19th of November, and were found to have gained on an average $15\frac{1}{2}$ lbs. each.

"No. 13. Ten lambs fed upon cut Swedes gained during the six weeks, upon an average, 11 lbs. each.

"No. 14. Ten lambs fed upon cut cabbage gained during the time $16\frac{1}{2}$ lbs. each; showing, as I fully expected, a preference in favour of cabbage; but, to my equal surprise, a great difference in favour of the white turnip over the Swede. By subsequent experiments I found, as the cold weather advanced, that the cabbage and white turnip became of less value, and that the Swede improved. In the autumn of 1844, having placed my ram-lambs in their winter quarters, and observing that those placed upon cole seed were going on apparently the best, I determined to weigh a part of them, in comparison with those placed in pens upon grass land; consequently, on the 14th of October, 1844, the following lots were weighed as in the previous experiments; the ten placed upon the cole seed being selected from twenty-four others, and again placed with them.

"No. 15. Ten lambs penned upon cole seed, with cut clover chaff, were again weighed at the end of the first month, and found to have gained $12\frac{1}{2}$ lbs. each.

"No. 16. Ten lambs penned upon drumhead cabbage, with cut clover chaff, and weighed as above. They gained $10\frac{1}{2}$ lbs. each.

"No. 17. Ten lambs placed upon grass, and fed upon cut Swedes and cabbage of equal quantities, with clover chaff, gained $9\frac{3}{4}$ lbs. each.

"No. 18. Ten lambs placed upon grass, and fed upon cut white turnips and cabbage of equal quantities, with clover chaff, gained 11 lbs. each.

"Having frequently given my lambs carrots during the winter and spring months, and to no apparent advantage when compared with other roots, I determined to test their qualities after the expiration of the above experiments, and the No. 16 lot were supplied with what Swedes they would eat, and the No. 17 lot with carrots.

"No. 19. Ten lambs fed upon cut Swedes and clover chaff were again weighed on the 9th of December. They were found to have gained during the month 10 lbs. each; they consumed 22 lbs. of turnips each per day.

"No. 20. Ten lambs fed upon cut carrots and clover chaff were weighed as above, on the 9th of December, and were found to have gained $9\frac{1}{4}$ lbs. each; they consumed $22\frac{1}{2}$ lbs. of carrots each per day; thus proving that the carrot cannot be given to sheep with equal profit, when compared with the Swede turnip, the carrot being more expensive

and hazardous in its cultivation, and producing rather less animal food from a given weight at this season of the year.

"By a careful review of these experiments throughout, it will be found that *warmth* is proved to be an important feature in sheep husbandry, and is a subject affecting the rural economy of the whole nation. For instance, taking the average temperature of a sheep's body at 100 degrees, and the average temperature of our climate at 60 degrees, in every respiration of air the animal loses by the *exchange* animal heat equal to 40 degrees, which if not again supplied by the elements of food, or artificial warmth, the animal would cease to exist. Hence the animal frame becomes a machine for the conversion of vegetable food into animal food, as the animal heat produced by the supply of food is generated by the combustion caused by the union of the oxygen of the external air with the carbon, hydrogen, and other elements of the food. Thus when the temperature of the body is below the *standard* of heat, it requires a proportionate artificial warmth to economize the vegetable food, and assist the fattening propensities of the animal, which are governed materially by the formation of the internal structure or frame. For instance, when the chest is contracted the animal is restless, and the respirations are more frequent than with the wide open chest, which is the sure guide to quietude, and consequently fewer respirations. But when the animal body is forced *beyond* its *standard* of temperature, the result is proportionately unprofitable; the animal laws being impeded, nature withdraws her support, and the animal body becomes at once artificial, ungovernable, and exposed to every difficulty. The animal frequently sinks under the pressure which has been caused by extreme feeding, or improper ventilation when placed in sheds, as the exhalation of the animal would enter into a state of decay, or unite with the oxygen of the air, and thus be again inhaled, and conveyed to the lungs and intestines, the seat of all infirmities. Thus having been supplied with too great a stimulant in the shape of food for the amount of oxygen inhaled, the system becomes deranged, and the digestive organs cease to perform their functions, and as the temperature of the body exceeds the standard of heat (see experiment No. 11), so advances the danger of inflammation and apoplexy, which can alone be stayed by cooling medicine, and by the animal being gradually exposed to the free temperature of the air, when, from the additional oxygen received combined with the exercise and increased velocity of its respirations, the animal body is restored to its standard of heat and health. Thus, to keep up the temperature of the body for its required purposes, it is necessary to supply food or warmth according to the temperature of

the situation. The principle therefore is confined to this, viz., at all times endeavour to keep the animal body at an even temperature—which must be adjusted as the seasons roll on, or as the soil and climate vary in the different localities; for instance, when sheep are kept in sheds during the winter, and are intended to be kept on through the summer, a corresponding temperature must be observed, or the animal machine will cease to perform its fattening evolutions, which is beautifully shown by the increasing fatigue experienced by the sheep to support his warm winter coat as the spring months advance, and which nature directs should be cast off at the expiration of its functions. Many breeders have a dread of clipping their sheep early. Experience has taught me to consider the animal first, which dictates the removal of the fleece when the great change of temperature takes place, as the animal loses flesh under the sudden increased pressure of heat. By various experiments carried on through the summer months, to test the difference of weight gathered by the different lots of sheep that had been fed in the different degrees of heat during the previous winter, I found that those sheep which had been kept the coolest increased most, and that those fed in the warmest sheds made but little progress when exposed to the free temperature of the air, thus proving that all animals intended for the butcher should be sold from the sheds. I have since adopted a middle course with rams that were intended to be shown the following September, and have provided a number of boarded trays for the purpose of supplying them at all seasons of the year with open sheds. The heads (supporters) of these are made of oak, six feet long by four inches square, and hooped on the top; the frame or tray is nine feet long, and boarded with feather-edged board, four feet deep, leaving about twenty inches to be placed in the ground. Four of these trays, two at the back and one at each end, make an excellent open shed for eight or ten sheep, according to their size, to run under. These trays are placed open to the south during the winter, and being portable are removed with the sheep to the clover or tares for the summer, when they are reversed to keep out the heat, but regularly littered with clean straw or stubble. This the sheep enjoy, and they are induced by it to remain under cover during the heat of the day. When placed upon clover, a constant supply of green tares in racks during the heat of the summer is very desirable to cool the system, or reduce the pressure of heat upon the animal body, that the process of fattening may be carried on with greater success, as on an even temperature of heat depends the composition of animal food, and the consequent return for the vegetable food consumed."

To this we add a note by Mr. H. S. Thompson,

tending to the modification of some of Mr. Smith's views. "All our great authorities represent the variation of temperature of the animal body to be confined within very narrow limits indeed. Liebig, in fact, hardly allows it any scope at all. The most trustworthy observations prove that in *all climates*, in the temperate zones as well as at the equator or the poles, the temperature of the body in man, and what are commonly termed warm-blooded animals, is *invariably* the same.—*Liebig's Organic Chemistry of Physiology*, p. 19. But whatever be the exact amount of animal temperature, Mr. Smith, as an eminently practical man, will, I am sure, admit that in practice it would never do to vary the treatment of our flock whenever the thermometer showed a minute alteration in the temperature of their blood, and that the simpler the practical rule can be made, which is founded on scientific principles, the more likely is it to be generally acted on. I would suggest therefore that instead of endeavouring to *keep the animal body at an even temperature*, it would be better simply to recommend flock-masters to keep their flock as warm as they can, consistently with *perfect ventilation*, and that the principal points to pay attention to, are—1st, that the cost of the

shelter is not such as to absorb the profit arising from its use; and 2nd, that the health and well-doing of the sheep should decide whether the warmth and confinement are carried too far or not."

It would be here out of place to enter at large into the physiology of animal heat. We may observe, however, that the system is taxed rather by the resistance it is called upon to make against cold on the one hand or a high temperature on the other, than by any great change or alteration which takes place in its own degree of heat under either circumstance. There is an inferior as well as superior limit to the change of temperature in living bodies from the influence of the atmosphere, or surrounding objects or agents generally; and if the vital powers be incapable of counteracting this influence, death is the consequence. With regard to the source of animal heat, it may perhaps be referred to the various electrical changes which accompany the endless combinations and decompositions which take place in the system throughout the whole of life, and which, resulting from the laws of vitality, are themselves necessary to the maintenance of organic existence—the body on their cessation surrendering itself to other laws, those of inanimate matter.

CHAPTER XII.

DISEASES OF SHEEP.

IN our account of the diseases of the sheep, it will be our aim to simplify the details as much as possible, so as to render them useful to the farmer who possesses no accurate anatomical knowledge. We would here, as we have done in the history of the Ox, advise the farmer to beware of the nostrums of the farrier, and in all serious cases to call in the veterinary surgeon, by whom all important operations ought to be performed, if only for the sake of humanity, inasmuch as his knowledge and manual dexterity will often save needless sufferings. An individual sheep it is true is not, in a pecuniary sense, so valuable as a bullock or cow, and its loss is therefore the less felt; unless indeed in the case of rams or ewes of peculiar value from their breed and excellent properties, and which could not be replaced except by a considerable outlay,—still, as we have said, looking at the ordinary flocks of good sheep, the loss of one is less felt by the farmer than that of one of his horned cattle would be, and he is therefore often perhaps only *proportionably* concerned respecting it. This however should not be. In many instances it would, we think, be best to kill the animal immediately, and thereby not

only save it from suffering and perhaps a lingering death, but prevent the loss of the mutton, which is a consideration. We allude to such accidents as fracture of the skull with injury of the brain, fracture of the limbs (except in a part where the application of splints is easy), severe wounds, and cases of the like nature, where ultimate cure is problematical, and if even it were certain, would involve great trouble, and perhaps more than trifling expense.

When large flocks of sheep are depastured on remote tracts of great extent, as on the Cheviots and similar localities, where the veterinary surgeon is out of reach, the sheep are necessarily intrusted to the hands of the shepherd in all cases of accident or disease. Many of these men, shrewd and sensible, and accustomed from infancy to the management of sheep, have by practice and observation acquired considerable skill, and often perform serious operations with success; still, it would be desirable could they be regularly trained up on a good system, embracing lectures on the anatomy and diseases of the sheep, and practical dissection. In France, and we believe on other parts of the Continent, practical schools for shepherds have

been instituted; but with what degree of general advantage we are not able to ascertain. In Scotland, where education is accessible to the peasant, and indeed where the peasantry may be fairly called an educated race—(of this class were Burns, Hogg, and others, whose names will never be forgotten)—such schools might, we think, be established without much difficulty. They might be in a great measure supported by the large sheep proprietors, and be thus rendered available to those destined to follow the shepherd's useful calling. The advantage of having for their head or responsible shepherds men thus expressly educated must, we think, be admitted by every owner of flocks—especially in localities which render it necessary to trust to the shepherd's skill and judgment. We offer these remarks merely by way of suggestion, and without presuming upon our opinion. We think the subject, however, worth some consideration.

Without entering into minute anatomical details, there are a few preliminary observations which we cannot avoid, and which will not, we think, be unacceptable.

First, with respect to the nervous system.—The brain of the sheep is somewhat larger, in proportion to the size of the animal, than that of the ox—that of the latter being about 1-800th part the weight of the animal, that of the sheep about 1-750th; and the proportion between the *cortical* or *cineritious* substance of this organ, and the *medullary* or internal substance, is about the same as in the oxen; as is also the relative size of the nerves to that of the brain. In the sheep, the nervous energies are soon exhausted. It is not fitted for labour: it is destined by providence to yield food and clothing to man; hence it receives no education—it is trained to no employment—it undergoes no discipline. Yet we do not rate the real intelligence of the sheep at a less degree than that of the ox. We have seen domesticated individuals as familiar, as bold, and as sprightly as the goat. A few weeks since, a coal-black sheep, with small horns, and a clothing of curls of hair, not wool (but from what country we could not learn), came under our notice. It was in the Bridge Road, Hammersmith. At a distance we took it for a goat—its manners were goat-like. It entered several shops with the greatest audacity, and out of one of them, a baker's, it was not easily dislodged. It was familiar with all who noticed it, very playful, and in fact exhibited all the characteristic features of a pet goat kept in a public stable-yard; and was as much at home in the street, and as confident, as if it knew its rights and was determined to assert them. Other examples of a somewhat similar nature are upon record, proving that the sheep is not unsusceptible of profiting by that education which renders the

ox companionable and trusting, and the goat intrusive and petulant.

Secondly, with respect to the arterial and venous systems.—We need not particularly describe the heart, which consists of two auricles and two ventricles as usual; but we may observe, that the right ventricle, which is considerably larger than the left, and has its muscular walls very thin, not only contains more blood than the left ventricle, but has less power to act upon it. The difference between these cavities is greater in the ox than in the horse, and in the sheep than in the ox. From the inefficiency of the contraction of the right ventricle, the whole of the blood is not expelled from it into the pulmonary system by each stroke; hence, under certain states of the circulation, it may happen that an accumulation of blood may take place in this ventricle which the muscular walls of the cavity may not be able to expel; and under such circumstances the danger of rupturing the ventricle would be imminent. But in order to prevent this, a strong muscular column, of considerable thickness, extends obliquely across the ventricle from the upper part of the inner wall, or division between the two ventricles, to the lower part of the outer wall, and by its contraction supports the ventricle where the wall is thinnest, and assists its expulsive action. Besides this, there is a second tendinous band lower down in the ventricle, with many roots, which still further contributes to the security of the part. In the ox we find a similar provision for strengthening the right ventricle as in the sheep, but somewhat modified.

The oppression to which, in these animals destined to give us food, the heart is liable from over-driving and severe exercise, ought to be impressed upon the mind of all shepherds and farm servants, all drovers or men who have to do with these animals. It is, we would wish to persuade ourselves, more from ignorance than wanton cruelty that these animals are often, as we have seen, so severely punished. He that knows what it is to labour under oppression of the heart, either from violent running or from some organic affection, will feel for a poor sheep, chased till it drops by the dog of some brute in human form.

There is another peculiarity in the heart of sheep and other ruminants which we may just notice. At the base of the aorta and pulmonary artery there is a bone, somewhat triangular in form, destined to support and strengthen both those most important vessels, but especially the former. A small bone of the same kind occurs in the heart of the horse; but in the sheep and ox these vessels are proportionably larger, and this bone (the *os cordis*) is in due relationship to them.

The arterial pulse of the sheep, adult, quiet, and in a state of health, is about seventy per

minute, or perhaps seventy-five. It may be conveniently felt at the femoral artery, which runs obliquely down the inside of the thigh; but the usual plan in order to determine the force or weakness of the circulation, is to try the action of the heart itself by placing the hand on the left side of the chest, where its beating may be felt. We need scarcely say, that the character of the pulse is a great guide in the diagnosis and treatment of disease.

There is another point connected with the circulation which demands notice. On the skin, as we well know, open the mouths of multitudes of exhalent vessels of great minuteness—the vessels of perspiration. These vessels are really the terminating tubes of minute arteries (for all do not merge into veins), through which effete matters from the blood are thrown off in the form of a fluid or vapour. But besides the simple exhalent vessels, there are others destined to produce secretions of a peculiar nature, of which we cannot often understand the utility—(take musk and castoreum as examples). Now, it would appear that the simple exhalent or perspiratory vessels on the skin of the sheep do not act with the ease with which they do in man or the horse, in whom, labouring in muscular exercise, the flow of perspiration acts so beneficially, relieving the blood of its effete particles, to the benefit of the heart and lungs, to the freedom of respiration, and the maintenance of muscular energy.

But while the exhalent pores in the skin of the sheep are sluggish in their action, another set of pores are peculiarly active (if indeed the two sets are really to be distinguished from each other), secreting a peculiar unctuous fluid, commonly termed the *yolk*, to which we have previously alluded. This *yolk*, a soapy adhesive matter, is evidently provided for the nourishment of the wool, and for defending it from being saturated by wet. In the secretion of this, the skin of the sheep is greatly occupied, to the expense of what may be called simple perspiration. This secretion goes on regularly and imbues the fleece, while that of the simple exhalents is thrown out with difficulty.

In this circumstance we have another reason why sheep, when hurried or driven about, labour in breathing, and pant violently.

When man and the horse, with most other quadrupeds, undergo violent and especially rapid exertion, the blood, rushing with increased rapidity through the frame, and consequently undergoing changes more quickly than while the body is in a state of quietude, throws off a great portion of its effete or useless part in the form of perspiration.

The "toil drops" flow freely, to the relief of the system, and especially of the lungs, which would otherwise have a double duty to perform;

and the fact is, that in the sheep, when over-driven, the lungs have to perform the double duty; hence the animal is soon distressed, breathes hard, and exhales from the lungs a great quantity of vapour.

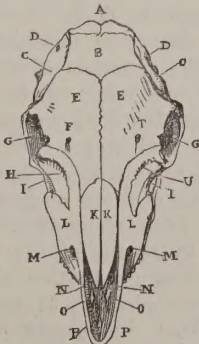
Mr. Youatt, with much acumen, has observed, that "it is probably on account of this want of action in the capillaries of the sheep, and the uniform defence (of wool) which is assigned to it, that the sheep is evidently less liable than most other animals to rheumatism, to inflammation of the lungs, and to various other diseases, consequent on direct exposure to a changeable state of the atmosphere. On the other hand, it is probably owing to the struggle between the closed and comparatively unused pores of the skin, and the various matters that are frequently determined to it and are labouring to escape through it, that the skin of the sheep is so much more liable to disease than that of most other quadrupeds. The scab, when it gets into a flock, is a greater nuisance than any disease of the skin to which the horse or the ox is exposed. There are occasional aggravations of the scab among the British flocks; and on the continent there are cutaneous diseases which destroy hundreds of thousands of sheep every year."

The quantity of blood in the sheep is less in proportion to the animal's weight than it is in most other animals; and in abstracting blood care must be taken not to reduce the vital powers too low, for the sheep rallies with difficulty. This should ever be borne in mind. In a spare but muscular and healthy man, the *pure* blood is about one-fifth part of his weight; but its proportion decreases in accordance with his increasing corpulency. In the horse it is estimated to average one-eighteenth part of his whole weight, and in the fairly conditioned ox somewhat more than a twentieth part; whereas in the sheep, supposing the animal to be in fair marketable condition, it amounts only to one-twenty-second part of his weight; and in higher fatted sheep from one-twenty-fifth to one-twenty-eighth. It must be remembered we are speaking only of the red sanguineous fluid contained in the heart, arteries, and veins—the "purple stream of life." With respect to the quantity of blood to be taken from the sheep, it will of course vary according to the necessity of the case and the judgment of the practitioner, and may extend from half a pint or less to a pint or even a pint and a half; but care should be taken to watch the first falterings of the arterial action. Blood is obtained from sheep in various ways. Some cut the nostrils, the ears, the lips, &c., giving pain and doing no good. Many shepherds bleed from the angular or cheek vein, and that by means of a lancet—the swelling of the vein being effected by dexterous compression with the fingers near the posterior angle of the jaw. But we deem it the best practice

to bleed at once from the jugular or neck vein, as in the horse and ox;—it may be done without even cutting any of the wool away, but by parting it fairly asunder, and using the lancet neatly, while an assistant secures the animal. Pressure either with the fingers or by means of a ligature (and the former is the better plan) will make the vein rise; and the bleeding may be stopped by a pin and a little tow, or a few fibres of wool twisted round it. Occasionally the *saphena* or thigh vein is opened. The mode of bleeding with address and precision, whether it respects man or any of the lower animals, can only be acquired by observation and practice. Every one uses his fingers in a mode peculiarly his own (hence the different styles of handwriting); and no directions can teach that which is to be learned by trials only. Thus it is that verbal instructions merely will never teach a person how to fence or swim.

Thirdly, with respect to the skull.—It would be well if all sheep farmers rendered themselves well acquainted with the skull of the sheep, and kept by them for reference the skulls of the different breeds, and especially of those which they themselves have cultivated. There are certain diseases, afterwards to be explained, to which the sheep is peculiarly liable, rendering a knowledge of this part of the osseous frame-work of great importance.

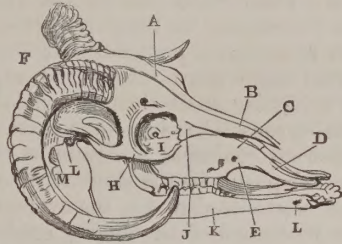
It is not necessary to describe the general form of the skull of the sheep, because all are familiar with it. It differs in minor details in different breeds. Some have the jaws more elongated than others; some are horned, sometimes many-horned; others are polled; in some the forehead is very much elevated, or rather arched; in some it is nearly flat. The annexed views of the skull in front and in profile will serve to convey a clear idea of the relationship of the bones externally to each other.



FRONT VIEW OF SHEEP'S SKULL POLLED.

- A The occipital bone.
B The parietal bones consolidated into one square bone, the suture having become obliterated.

- C The squamous portion of the temporal bone.
D The meatus auditorius, or opening into the internal ear.
E The two frontal bones, which in man form only one portion as a rule.
F Supra-orbital foramina, or orifices for the passage of nerves and blood vessels.
G The bony orbits of the eye.
H The zygomatic or malar bones.
I The lachrymal bones, of considerable development.
K The nasal bones.
L The superior maxillary bones.
M Suborbital foramen, for the passage of nerves and blood vessels.
N The nasal processes of the intermaxillary bones.
O The palatine processes of ditto.
P The intermaxillary bones, on the under part of which the firm pad opposed to the cutting teeth of the lower jaw is seated.



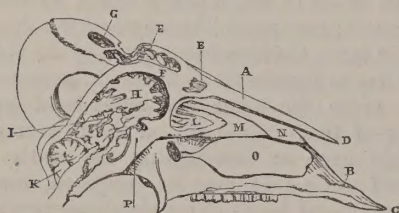
PROFILE OF SHEEP'S SKULL HORNED.

- A Frontal bones.
B Nasal bones.
C Superior maxillary bones.
D Intermaxillary bones.
E Suborbital foramen.
F Occipital bone.
G Temporal bone, with the auditory foramen or meatus auditorius.
H Malar bone, forming with the temporal bone the zygomatic arch.
I The orbit.
J The lacrimal bone.
K The lower jaw, or inferior maxillary bone, consisting of two branches united anteriorly, or at the chin, by a suture.
L Foramen for the passage of nerves and blood vessels.

The mode in which sheep attack an enemy is well known; they run full butt against the object with all their force, the blow being given by the forehead, which has to sustain the violence of the concussion; hence arose the name and figure-head or iron-arming of that engine of war the battering ram, formerly used in demolishing the walls of beleagured cities. It may be supposed from this that the frontal bones of the sheep are very strong, and their bold convexity tends still further to their security. Still it might be thought that the powerful shock occasioned by the blow would affect the brain; but this is not the case. If we were to judge of the brain of the sheep by the convexity of the frontal bones, viewed externally, we should be deceived in our estimation of its volume. The frontal bone is deceptive in this point of view: it is intended to protect the brain in the part most exposed to the reception of injury, and between the brain and the surface of the frontal bones there is a great distance. The two tables or plates, an external and an internal plate, of

which the frontal bones consist, are separated to a distance from each other. The inner table immediately covering the brain is thick, and between it and the external table is an extensive cavity, extending even far up into the bony cores of the horns (in horned sheep). This vast cavity is termed the *frontal sinus*. Now it is reasonable to suppose that the external table, forming as it were the roof of this extensive vault or sinus, would easily be broken in by a heavy blow,—not so; it is everywhere supported by pillars and walls rising up from the thick inner table or floor, being thus divided into numerous cells or compartments. These walls and pillars, while they add little to weight, by their reception of the concussion along their perpendicular line, make the external table more strong and capable of enduring a heavier shock than it would be were the two tables consolidated into one plate.

We have an analogous structure in the forehead of the elephant, in the skull of the sloth, in that of the fossil mylodon, &c., the evident design being the protection of the brain, rendered the more necessary by peculiarities of habit and mode of life. The ox possesses extensive frontal sinuses. The frontal sinuses of the sheep communicate with certain cells forming the maxillary sinus (in the superior maxillary bone), and this communicates with the extensive nasal cavity, through an aperture under the turbinated bone; and the lining membrane of the nasal cavity is carried out as a lining also to the whole of these vaults or chambers, and in this sense may be considered as appendages to the nasal cavity. The annexed representation of a longitudinal vertical section of the skull of the sheep will show the character and extent of the frontal sinuses.



SECTION OF SKULL.

- A D The nasal bone.
- B Upper maxillary bone.
- C Intermaxillary bone.
- E E The frontal sinuses, separating the two tables of the skull.
- G The frontal sinuses, extending up the bony core of the horns.
- H I The cerebrum, or large anterior portion of the brain.
- K The cerebellum.
- L The ethmoid bone; to the left of which is seen the thin cribriform plate, separating the nasal cavity from the brain.
- M The lower portions of the developed ethmoid bone.
- N The superior turbinated bone.
- O The inferior turbinated bone.
- P The sphenoid bone.

Having thus far explained the nature of the frontal sinuses, we may observe, that they are

liable to invasion by a singular intruder—namely, the larva of a fly of the Dipterous order—the gadfly of the sheep (*Æstrus ovis*). This fly is common, more especially in wooded districts, from May to July, and is as much the terror of the flock as its near relative the *Æstrus bovis* is of the herd; but it acts in a different manner. It endeavours to deposit its eggs within the *alæ* or flaps of the nostrils, where, by reason of the warmth and moisture, they are very speedily vivified; the larvæ or maggots, then small, begin to make their way into the nasal cavity, and ultimately trace their winding course into the frontal sinuses. The appearance of the fly occasions terror, but the larvæ, in their course through the nasal cavity, almost drive the sheep to distraction. They crawl along by means of two small hooks or crotchets, which grow on each side of the mouth; and by these they fix themselves when they have arrived at their destined nidus—feeding upon the mucus secreted by the lining membrane of the chambers. In process of time the larva attains to the length of about an inch; it is somewhat flattened, and composed of eleven rings, edged with a few short bristles; between the rings, on the under surface, are small red spines, the points of which are directed backwards. These spines evidently assist in progression. In the spring the larvæ are becoming mature, and now begin to retrace their passage into the nasal cavity. This again throws the sheep into distraction. It stamps, it tosses its head about, it sneezes violently, and so continues till the maggot or maggots are expelled. Seldom, however, more than one or two—sometimes three—tenant the sinuses of a single sheep. After expulsion from the nostrils, these maggots are restless, and crawl about, till they bury themselves in the earth, and assume the pupa condition; and in six weeks or two months the perfect insect is disengaged from its pupa case, and is soon prepared to commence its incursions upon the flock.

The actual degree of mischief occasioned to the sheep by the presence of the larvæ of the *Æstrus ovis* is not very satisfactorily attained. Many writers describe it as amounting to convulsions, giddiness, and stupor; but may they not have confounded some true cerebral affection with the mere presence of these maggots? Be this as it may, it has been recommended to open the frontal sinuses by means of the trephine (an instrument for removing a portion of the bone); but look at the consequences. It may be (and the chance is even) that the maggot is lodged within the core of one of the horns—nay, it may never have proceeded beyond the turbinated bones of the nasal cavity; and in these cases a severe operation will have been uselessly performed. That both the ascent and descent of the maggot

occasions dreadful irritation is certain—every action of the sheep evinces it; nevertheless it is supposed by some, and among them by Mr. Bracy Clark, that the drainage of mucus from the membrane of the sinuses, occasioned by them, may really tend to the health of the animal, by diminishing the chances of apoplexy or of cerebral inflammation. As far as our experience goes, we should say that these larvæ, when once lodged within the chambers of the sinuses, if they do no good at least do little harm; we have frequently seen them removed from the skulls of sheep killed in good condition, but we will not affirm that they may not occasionally produce great irritation, amounting even to delirium. Usually, however, during the protracted lodgment of this larva in its nidus, there is no symptom exhibited by which its presence can be determined.

The goat on the continent is subject to the invasions of this maggot equally with the sheep; and the fact was known to the ancients, although they deemed it bred "*madidis cerebri latebris*," in the dripping cells of the brain. (See *Réaumur, Mémoires pour servir à l'histoire des Insectes*, vol. iv.)

HYDATIDS IN THE BRAIN.

If the maggot of the *Æstrus ovis* be not, as the ancients imagined, bred in the brain, there is a parasite bred there far more formidable from the effects it produces than the sinus-haunting larva. We allude to the presence of those strange creatures which take up their nidus either upon the surface or within the very substance of the brain, termed hydatids.

A sheep labouring under this severe affliction is said, in the language of the farmer, to have the *turnsick*, the *giddy*, the *goggles*, the *sturdy*, the *dunt*, &c.; names bearing some allusion to the symptoms produced.

The species of hydatid met with in the brain of the sheep is the *Cœnurus cerebialis*. This parasite (one of the *sterelmentha*—sub-class, *acrita*) consists of a thin globular sac, varying in size, and of a fibrous structure; it is transparent, and filled with a glairy fluid. On the surface of the sac are to be seen clusters of opaque spots, which, when examined by a microscope, are found to be heads, encircled above by recurved spines, and furnished round the sides with four suckorial discs; through these pores nutriment is conveyed to the sac. These singular creatures have the power of contracting and expanding the sac, which is formed of fibrous tissue, in two or three layers. Their motions, when removed from the animals they infest and put into luke-warm water, are very perceptible. One of the fibrous layers is probably muscular. The reproduction of these strange creatures is, it would appear, by minute internal buds or gemmules, which grow on the membranous walls of the sac, and which on

attaining a certain size become detached, and may be seen, by means of a lens, floating in the gelatinous fluid with which the sac is filled. According to the observations of Mr. Youatt, who is speaking more particularly of the cerebral hydatid, when the fluid contained in the sac or cyst is clear, the internal membrane, when examined by means of a lens, will be found covered with a countless multitude of little grain-like bodies, disposed in regular lines, and adhering by filmy particles; these he calls eggs, others call them gemmules. But when the fluid is turbid, it will be found full of apparently fibrous particles, which, when viewed through a microscope, exhibit the appearance of minute worm-like bodies, many eggs being also intermingled with them; and when a still more turbid and opaque state of the fluid prevails, it is owing to the immense quantity of these worms, while all the eggs or gemmules have disappeared. These worms, he says, are about half a line in length, the head is in the form of a tetragon or four-sided figure, with a circle of rays at its summit, and a mouth on each of the four sides; the neck is short, and the body covered with rings or wrinkles. They swim about with velocity, and appear to be possessed of great activity. They have also the peculiar property of issuing from and of returning at pleasure to the parent cyst, which they ordinarily tenant. If the cyst be removed from the brain, hundreds of them may be forced through the numerous heads of the hydatid by the slightest pressure, and at other times, when the cyst is examined, numbers of them will be found within or in the act of protruding from the various oral apertures. Are these worms parasites within a parasite, or are they young hydatids? Perhaps the latter. Another curious fact may be here mentioned, which has frequently come under our own observation. One of these hydatids is very often found to have its cyst filled with multitudes of small but perfect hydatids (query, the above-mentioned worms in a more mature condition?) These are of various sizes, and sometimes amount to scores. Mr. Youatt gives an instance in which an hydatid larger than the egg of a goose, found in the abdominal cavity of a monkey, contained more than ten thousand minute but perfect cysts, together with a countless number of granules or gemmules, which lined the membranous cyst of the parent hydatid, and which must be regarded as the germs of a future race.

It would appear from this, then, that after becoming detached, the granules, gemmules, or eggs, at first assume a worm-like character, with a true hydatid's head, and a wrinkled body capable of expansion, and that such as remain in the parent cyst (whatever may become of the others) assume the true form, and perhaps may be regarded as parasites upon their parasitic parent. But granting all this, then comes the question, By

what means come these hydatids into the brain of the sheep? and this applies to their presence in any other part of the animal frame. A few thoughts on this subject, which we communicated to a periodical publication, it may be perhaps allowable for us here to repeat:—Let us conceive of an animal dying from the mischief caused by an hydatid on the brain, which hydatid is laden internally by millions of granules, the presumed germs of so many perfect *entozoa*. Now it is granted that the parent *entozoon* perishes, but it does not follow that the granules or ova which it contains also lose their vitality. An animal so low in the scale of being, organically lower than even plants in general, and which is destitute not only of a distinguishable nervous system but of vessels of circulation also, it is by no means going too far to consider the microscopic ova as still retaining their vitality. But how long will they retain that vitality? Probably for years. The seeds of plants have been known to retain their vitality for hundreds nay thousands of years, and then to germinate under favourable circumstances; and so may the granular germs of the *entozoa*. After the death of their parent, they may mingle with the atmosphere or the earth of the fields, they may be absorbed by plants and contained in their sap-vessels, and remain torpid during a thousand changes of situation. But suppose them to be taken into the system of an animal, an animal weakly or inclined to disease (for in such only we suspect do they become developed), and what is the result? The ovum, taken into the system with the food, is uninjured by the imperfect digestive process, is carried through the blood-vessels, threading their tortuous mazes, their minutest capillaries, till at length it reaches a situation in which its development shall commence. Its development commencing, it gradually increases, attains its normal characters, reproduces in turn its myriads of granules, and perishes. Thus, then, we think may the presence of hydatids be accounted for. Animal bodies, be it remembered, are not solid; they are not like iron, they are bundles of tubes, they are porous; the air permeates them; and they are ever changing their constituents.

It may here be asked, How happens it that hydatids are not found in all sheep, and in all animals fitted to sustain them? Perhaps, in perfectly healthy animals, the vigorous circulation of the fluids, the rapid change in the constituent particles of the body, or the condition of the blood, may tend to prevent their development, while those ill-understood conditions which primarily constitute an unhealthy or debilitated system, that languid or feverish circulation, that loss of tone in the nervous and muscular systems, that depraved condition of the organs of absorption and secretion, may favour their development.

But what becomes of the myriads of ova which never find such a favourable nidus; do these perish? and if so, is there not an immense creation of vitality for no end? We do not know; and if it be so, analogous cases are not wanting. The seeds which the thistle or the dandelion scatters to the winds do not all germinate—numbers perish, but sufficient find a nidus in which to develop and continue the species. It may be, however, that the ovum of the hydatid, when not developed in an animal body, becomes under other circumstances a being so altered or modified in form and appearance as not to be recognised; its growth and characters as an hydatid may depend entirely upon the supply of animalized food within its power of absorption. In the water it may be one of the strange animalcules of which we only know that “little is known.” We do not say this is the case—we merely suggest a possibility; indeed the more we become acquainted with the lowest forms of the animal creation, perhaps we ought to say its simplest forms, the more do we become convinced that the laws applicable to the higher class do not apply to them. Who could expect to find the gemmules of a sponge active locomotive beings swimming freely about, or to see the young of the barnacle (*lepas*) careering through the water; and who in these animated germs would, without experience, be able to predicate respecting the forms they were destined to assume!

In what form, or in what condition, or in what habitation, the Creator originally constructed and placed the hydatid, we pretend not to say; but if it be that the hydatid is an *hydatid* only when nourished within animal bodies, we may conclude that its original form is that of some animalcule yet to be discovered, perhaps in the juice of plants, perhaps in the water, perhaps in both. And it may be that it is from these animalcules, and not from the granules or ova of animal-nourished hydatids, that the sheep or other animal derives the gradually expanding and life-destroying pest, slowly preying upon its vitals. But however it be, whether ample provision is made for the safety of a sufficient number of the ova of the hydatid to continue the species, or whether these perish with the parent, and it is from the original animalcules that the race of hydatids is continued, of this we may be sure, that the hydatid is not, as some suppose, a spontaneous production, the offspring of self-creation, terms involving contradiction—nay, impiety.

From this digression respecting the hydatids themselves, a digression not unwarranted, we may proceed to a detail of the symptoms produced by their presence in the brain of the sheep, to which we wish we could add a certain mode of relief, but, alas! the chance of permanent cure is slight and precarious.

It is seldom in the second year, and rare after that age, that sheep are affected with this disease, the *sturdy* or *turnsick*, from the presence of these parasites. It appears principally in the first year, and oftenest during the first six months of the animal's existence, and is most prevalent in damp low situations, boggy districts, and in a cold wet spring, when the earth is drenched with chilling rains. It is then that some of the weaklier lambs begin to exhibit strange symptoms, and others take their turn, first exhibiting the signs of debility.

At first the lamb seems dejected and dull, it foregoes its frolics, it cares not to associate with its companions, it mopes alone; soon its step becomes vacillating and unsteady, and it often staggers; sometimes it stands in a state of unconsciousness gazing with a stupid stare, then, as if some fearful object had started up, it flies off in terror, and at its utmost speed, stops again, and stares vacantly as before. Often it pores over the glassy water of a ditch or streamlet, till at last it reels giddily and sometimes falls in. All this time it eats little, it becomes meagre, its countenance is haggard, its eye vacant and of a singular blue colour, a marked character of this affection.

These symptoms increase, the glassy water is more attractive, the fits of vacant abstraction and sudden terror become more frequent, and there is a twist to one side in the animal's neck. Soon the sheep commences a rotatory motion in one direction, according to the twist of the neck; and, if it feed at all, goes round and round as it gathers the herbage. It is now that blindness begins to come on, surrounding objects are unseen, the rotatory motion increases, for an hour or more at a time the animal wheels round and round, it falls, it rises up, stands in vacant stupor, commences its rotations, and at length dies an emaciated frame; or falls into some brook, or down some steep place, and so perishes.

What are the appearances which on opening the skull will present themselves? Variable as to number and situation, in or upon the brain will be found these hydatids: sometimes they oppress the surface of the cerebrum under the pia mater; sometimes they occupy the middle scissure of the brain; sometimes they tenant the ventricles; sometimes the cerebellum. Some writers pretend to distinguish, by the peculiarity in the eccentric movements of the sheep, that portion of the brain in which the hydatid or hydatids may be lodged; and to a certain extent this may be possible, but the knowledge brings with it little practical advantage. Sometimes before death the brain of the sheep is almost wholly wasted away by the slowly-growing parasite, leading us to wonder how it is possible that life under such circumstances could have been at all protracted. We know that portions of the brain may be destroyed or cut

away in all animals without the necessary destruction of life, but the following case is almost astounding.

At a meeting of the London Medical Society Mr. Stevens related the facts. A sheep afflicted with *sturdy* or *turnsick* was brought to him. He took out a portion of the skull with a trephine, and on cutting through the *dura mater* a very large hydatid partially protruded. He attempted to extract it whole, but it broke. He afterwards extracted the cyst, and on looking into the opening made with the trephine he found the interior to present a large empty cavity. The brain appeared to be completely gone. He let down a wax light through the opening into the cavity of the skull, when it appeared that nearly the whole of the brain was wanting. The hole was closed, and the sheep got up and fed, but on the morning of the *fourth* day it became convulsed and died. Upon opening the head a little only of the brain at its base was found, and some remains at the sides, forming an imperfect shell of brain. Several hydatids were still remaining upon it.—*Lancet*, 1830-1, vol. 1, p. 763.

This case might lead us into some physiological disquisition which we refrain from, as it would be out of place; but there is a point yet to be noticed.

When the hydatid is located upon the surface of the brain, its gradual pressure upwards or outwardly, slight as it may be, produces an absorption of the bony surface of the skull itself, according to the spot beneath which it is lodged. In this spot, generally a little anterior to the root of the horn, the skull feels soft and yielding, and it is here that an operation may be performed with some chance of saving the sheep. The object of the operation is to remove or destroy the hydatid cyst. If the skull over the cyst be completely absorbed, a cross-wise incision may be made over the part, the flaps of skin turned back, and the hydatid exposed and removed altogether if possible. Should the bone be not absorbed, or freer access to the cyst required, the trephine may be used. It is important that the hydatid should be extracted whole, and this is by no means easy, sometimes impracticable; still the fluid must be removed, and afterwards the membrane of the cyst piecemeal, supposing that it has broken.

The French adopt a different plan, they merely puncture the cyst, at the spot where the skull is soft, with an awl, and place the sheep on its back, in order that as much of the fluid as possible may be discharged. This operation should be repeated every three or four days, with intervals of two days between each puncture. This operation is very simple, and more successful than any other.

Another operation in the case of hydatids in the brain has been recommended by Mr. Hogg. It

consists in pushing a wire, or sharp and slender trochar, (taking middle course) through the thin cribriform plate of the ethmoid bone into the brain, and so piercing the hydatid, the fluid of which escapes through the nostrils, or, if a trochar be used, through the canula. This operation Mr. Hogg states that he has performed many times with success. It is liable however to several objections. It is not easy to hit the cribriform plate of the ethmoid bone (see fig. at p. 176, L.), and so enter the skull; and, granting that this be accomplished, except the hydatid be placed on the superior part of the brain it will not be punctured. There is in fact great uncertainty and danger in the operation: *uncertainty*, because the wire or trochar passes in one direction only, and consequently the greatest portion of the brain is out of its way, hence a hydatid deep in its surface, or in the cerebellum, cannot be attained; *danger*, because, although after the membranes and bones of the nose have been pierced, the sheep scarcely, if at all, feels the entrance of the wire into that portion of the brain through which it passes, still inflammation is greatly to be apprehended, and Mr. Hogg confesses that the sheep which die in consequence of wiring are in the greatest agonies, and utter piteous groans; sometimes a sheep when the wire pierces the brain will drop as if felled by the stroke of a pole-axe, and expire in a couple of minutes. From these circumstances, and the great probability that more than one hydatid exists, which the wire or trochar will not puncture, setting aside the difficulty of hitting the cribriform plate, we do not recommend the adoption of this mode of operating on the sheep. The French method is the simplest and the most effectual; but, granting the destruction of the hydatid by this or any other method, so liable is the disease to return, that as a general rule it is the best plan to fatten the animal as quickly as possible for the butcher. There are, we know, cases upon record of sheep having survived the operation of the trephine for years, and of their having bred yearly; but these are rare; indeed, he who permanently saves four sheep out of a dozen by the use of the trephine cannot be called unfortunate. By puncture on the French plan his chances are greater; the brain is more slowly relieved from its habitual pressure, no sudden vacuum is formed, no external air is admitted, and the blood-vessels gradually accommodate themselves to the change. One thing it is here needful to mention; the operation should not be delayed too long. When the bone of the skull has softened we may infer the awful extent of mischief which the brain has undergone, and in proportion to this is the chance of success diminished.

The prevention of every disease is better than the cure; in this disease it is so most decidedly.

But the question is, how is it to be prevented? By proper diet and air. Let the pasturage be well drained—let low humid cold spots be avoided—let the young lambs have proper shelter, and let care be taken of the ewes in the early part of the spring. It is advisable to let them have salt to lick, as is recommended by M. Giron de Buzaseinques. A weakly or feeble ewe will produce a weakly offspring. This disease is to be attributed to debility; for it is only in sickly feeble lambs that the hydatid will flourish.

Of various empirical modes of treatment in this disease—some of them brutal, as the application of branding irons to the skull, cutting off the ears of the animal, worrying the sheep by a dog, or chasing it till it is driven over some declivity, as the sides of a stone pit—we need not speak; they are disgraceful practices, and the ignorant alone will put faith in them.

HYDROCEPHALUS, OR WATER IN THE HEAD.

This disease, termed by some dropsy of the brain, goggles, &c., must be distinguished from the previous affection resulting from the presence of hydatids. It consists in an accumulation of serous fluid upon the surface of the brain, between the *pia mater* and the arachnoid coat; or within the brain itself, occupying the ventricles, and descending from the fifth ventricle even into the sheath of the *medulla oblongata*. The symptoms in this disease are more severe than in *sturdy* from hydatids, and its course is more rapid. It is, besides, mostly attended by some degree of paralysis, either in the fore or hind quarters; but the head is usually turned to one side. As in the human subject, *hydrocephalus* is sometimes *congenital*. The lamb is born with it, the head is enlarged, the bones soft, the sutures opened, and, in these cases, parturition is difficult; but the destruction of the lamb, essential perhaps to the safety of the mother, is of little moment.

In other cases, the disease comes on gradually. The lamb appears dull; it staggers a little as it walks; the bowels are constipated, sometimes violently relaxed; the appetite is variable, occasionally voracious, at other times lost; the animal now pines, and becomes thin; the skull enlarges; the stupidity increases, and the vital powers gradually sink.

Hydrocephalus may be regarded as incurable. It is not unfrequently accompanied by one or more hydatids, and in such a case all hope is out of the question. In pure hydrocephalus, bleeding, mercurial medicines, as the blue pill, in doses of about five grains, and purgatives, as Epsom salts or Glauber salts, in doses of two ounces, with a small quantity of ginger, have been recommended. We place little confidence in any plan of treatment.

The causes of this disease must be referred to

constitutional weakness; sometimes arising from bad management of the flock, sometimes from a peculiar predisposition inherited from one or both of the parents solely. In the latter case, the sooner the farmer can change his stock or introduce new blood into it the better; in the former case, he must alter his system of management, and attend to the health of his breeding ewes. Generally, however, we think that hydrocephalus results from an inherited predisposition; and that slight exciting causes will induce its commencement where the tendency to it exists. It is a disease of civilization (if we may use the term), and appears to be unknown among wild animals. It would be interesting to learn how far it prevails among savage tribes of men. Common as it is in refined Europe, we suspect that few cases occur in the South Sea Islands.

APOPLEXY, OR BLOOD-STRIKING.

This disease, which consists in a sudden and violent rush of blood to the vessels of the brain, producing extreme pressure and almost instant death, is very common among sheep. Sheep which are highly fed, and particularly such as are prepared for exhibition, are especially subject to it. Such animals should be narrowly watched, for the disease gives little warning, and all is soon over. Suddenly a sheep stands motionless, it staggers, it sees nothing, the eyes are fixed, the pupils dilated, the conjunctiva and the membranes of the nose are purple with blood or fiery red, the nostrils are dilated, the flanks heave, the breathing is stertorous, the animal reels, falls, and dies. Sheep fed up to a high degree of plethora, and then driven or excited, are in imminent danger. The heart beats quickly and strongly, the blood rushes in double tides through the arteries, the brain receives a volume which it is unable to bear, the animal is distressed, it lags behind the flock, half stupid and half blind, and suddenly it falls. Probably all hope of saving it is now lost, and what must be done should have been done previously, when the symptoms first manifested themselves. About a pound of blood must be taken from the jugular or neck vein—not the slow-bleeding eye vein—and afterwards a smart purgative must be administered, consisting of Epsom salts in a four ounce dose, to be repeated in ounce doses every four or six hours, until the medicine operates. Should these means happily succeed, the sheep must be placed upon scanty fare, and its plethoric condition reduced. After this let it be gradually prepared for the butcher, for one attack is too often the forerunner of others. Sometimes apoplectic symptoms, instead of suddenly producing death, terminate in inflammation of the brain, which is fatal in the course of a short time. Sheep fed on the rich pastures of Leicester-

shire, Romney Marsh, and other places where the soil is rich and the spring herbage luxuriant, are very liable to apoplexy, especially if the weather prove hot. A clover pasture is dangerous.

INFLAMMATION OF THE BRAIN, OR PHRENITIS.

Inflammation of the substance of the brain, or of its membranes, is produced by the same causes which occasion apoplexy. In this disease the vessels of the brain, or of its membranes, are gorged with blood, but not to such a degree of turgescence as to occasion sudden death, either from this cause or from the rupture of some vessel and effusion of blood.

In the first stage the sheep is dull, heavy, disinclined to move or to eat, and the eyes are bloodshot and staring; but the second stage soon comes on. The aspect of the countenance becomes wild, the animal gallops frantically about, rushes to the attack of its companions or of any person or object that happens to attract its notice, and evidently labours under furious delirium. Sometimes it dashes itself on the ground, and ultimately, in the midst of its violent efforts, staggers, falls, and dies, perhaps from the rupture of some blood-vessel on the brain.

Occasionally a whole flock, too suddenly removed from a very spare summer pasturage to a field of rich turnips, has been known to become affected altogether with phrenitis, to the great loss of the farmer.

This disease occurs more frequently among lambs than sheep, and they leap and dash themselves about in the wildest frenzy. Mr. J. Laurence, in his work on cattle, says, "On the borders of Suffolk, several scores of lambs were seized with an uncommon malady, leaping and jumping about the fold in a strange manner. A dunghill happening to have been raised almost to a level with the eaves of a low-tiled barn, a number of the lambs ran skipping to the top of the roof as if they were possessed by a thousand demons. The whole parish wisely concluded they were bewitched, and a wretched and aged pauper became the object of their suspicion and deadly hatred. The senseless and horrible supposed prevention was resorted to—namely, burning one of the poor animals alive."

This is, indeed, an instance of cruelty resulting from gross ignorance. Where, alas! was reason? Dormant in the minds of such persons is that faculty on which man is so apt to pride himself.

"T is education forms the common mind;
Just as the twig is bent, the tree's inclined."

With regard to the treatment in phrenitis, it may be summed up in a few words. Copious bleeding from the neck vein (jugular), followed by doses of Epsom salts, are the means em-

ployed, and the more promptly the better. Should these measures succeed, a sparing diet will be necessary, in order to prevent a recurrence of the disease.

RABIES, OR MADNESS.

The strange ferocity which sheep exhibit in phrenitis often leads the farmer to suspect that the poor animal is labouring under *rabies* from the bite of a rabid dog, and indeed rabid sheep often exhibit great ferocity; but there are symptoms which distinguish between the two diseases.

Rabies but too frequently occurs in flocks; a village cur or a sheep-dog becomes rabid, and in this condition prowls about bent on mischief; it enters the fold, it bites most of the sheep more or less seriously, more or less frequently; retreats—perhaps returns to the farm or village; is recognised as being *mad*, and soon destroyed. The farmer visits his fold, he finds all in great disorder, the sheep panting, terrified, and exhausted; he soon sees that they have been bitten and lacerated, and his suspicions are excited, perhaps confirmed, by the report of the destruction of a mad dog half a mile from the spot. What is to be done? The sheep must be carefully examined one by one. If the sheep have not been clipped the wounds will be about the face, lips, ears, and legs, for the deep wool will defend the body; but if the sheep are denuded of this covering, various parts of the body, as the sides, shoulders, thighs, &c., may be lacerated. Each wound should be thoroughly burnt by lunar caustic (nitrate of silver), of which a pencil should be formed capable of being inserted into every part; to effect the purpose decidedly, the wound, if necessary, should be enlarged by the knife, for unless the caustic have free access to the very depths of the wound, and cauterizes it thoroughly, there is no chance of saving the animal. Supposing this to be done, still the farmer will have to wait the result with anxiety—it is not always easy to determine that the wounds have been cauterized to their very depth; some slight puncture, moreover, may have escaped notice, and the system may have absorbed the poison before the application of the caustic. All then remains in uncertainty. If the disease lurks in the system, its symptoms may be expected to manifest themselves in the course of a fortnight, and from that time to the end of eight, ten, or even twelve weeks. At first the sheep display a tendency to annoy and chase each other; they cease to feed as usual, and begin to lose flesh. In the course of a day or two a strange stupor supervenes, especially in the case of the ewes, which soon become paralyzed and die, often without a struggle. It has been observed that the lambs fall into a succession of convulsive fits, which in the course of two or three days end in death. The

rams and wethers are generally affected in a somewhat different manner (as are sometimes also the ewes). They push their heads against the ground, against the bank-side or palings; and often, though they show no disposition to bite, use their horns or heads in striking each other with great violence, or run full butt against any object, repeating their blows till the skin is stripped from their foreheads. There is a profuse discharge of mucus from the nostrils, and of a frothy saliva from the mouth, but they exhibit no dread of water, nor do they seem to be tormented by insatiable thirst. They drink from the dirtiest puddles by preference; they eat mud and earth, nibble sticks or bits of wood, and swallow the portions; in their paroxysms of delirium they utter a peculiar kind of bleat in a high key, and with a strangely plaintive or wild wailing expression, and soon become paralyzed or torpid, occasionally convulsed, and die. Death generally takes place on the second or third day after the manifestation of the disease, but some survive even to the fifth.

The appearances which present themselves upon dissection are variable. Sometimes the membranes of the brain show the traces of active inflammation; occasionally the upper portion of the windpipe, as in the dog, has the vessels of its lining membrane injected with blood. The paunch is usually filled to a greater or less extent with bits of stick, mud, filth of various kinds; a peculiarly foetid smell is exhaled, and the inner lining is covered by abrupt patches of inflammation, often exhibiting in addition small spots of extravasated blood.

With respect to any treatment where rabies makes its appearance, we have nothing to say. Cure is hopeless. It may be asked, and the question is reasonable, Is there any danger to man or other animals from their coming in contact with rabid sheep? We should say, Yes. There is not, we believe, any well-authenticated instance of the sheep having communicated this disease, and it shows no disposition to bite; but we know that rabies may be communicated by the virus of the ox, the horse, the ass, the human being, and even, it is said, of the fowl; and therefore we may conclude that the virus of the sheep, received upon the surface of any scratch, or cut, or sore place, would communicate the dreadful malady. Perhaps the virus may not be so certain and so potent as is that of the dog, the wolf, or the cat (carnivorous animals), but still we cannot but believe that there is danger in handling rabid sheep, and that every precaution ought to be taken. The hands and face should be fairly protected against the possibility of their being smeared with the virus, and the enclosure, pen, or fold, in which sheep have died rabid, should be well cleared out, and the wattles, posts, or stakes against which they have

run a-tilt, be burnt. Perhaps this is not absolutely necessary, but who would not be cautious in such a case? A thorn or a splinter smeared with virus might prick a man's finger—who can foretell the consequence?

No one, we presume, would sell the carcase of a sheep killed when the symptoms of rabies had begun to show themselves. It is asserted, and we believe truly, that the meat might be eaten with perfect impunity; but no creditable farmer would thus act, even for conscience sake, to say nothing of the odium which would deservedly attach to him when the fact was discovered. But another question presents itself; suppose a farmer finds that a rabid dog has bitten several of his sheep, perhaps the day previously or the day before that, is he then justified in killing those animals for the market or selling them to the butcher? A great authority, Mr. Youatt, says that under such circumstances sheep may be "fairly and honestly" disposed of to the butcher. All we can say is that were we to know that the mutton on our table was that of a sheep which had been killed in order to anticipate its death from the results of the bite of a rabid dog, we should not be able to taste a single mouthful, nor do we think that others would much relish it. We say not that anything is to be apprehended, but we cannot divest our minds of unpleasant feelings; and the very name of *rabies* carries terror in its sound. In this case should not the farmer's axiom be—"Let me do as I would be done by." Would he partake of such flesh or put it before his family? We much doubt it.

LOCKED JAW, OR TETANUS.

This disease occasionally attacks sheep, and is usually produced by cold sleety rains, and severe weather, especially at lambing time. From the same causes, the young lambs themselves are still more subject to it, but in the young males another cause is apt to produce it, viz. the operation which they are doomed to undergo, and which is generally roughly performed, so as to give more than necessary pain, producing spasmodic contraction of the muscles generally, but particularly those of the jaws, which become strongly clenched.

In ordinary cases the symptoms are as follows: At first there is a peculiar spasmodic twitching of the head or of some of the limbs, a grinding of the teeth, and a rigidity of the jaws. In a few hours these symptoms increase, the frame generally becomes stiff, the neck is protruded, the head bent back, and as it were fixed; one of the limbs, moreover, is rigidly contracted, and the muscular frame in general is spasmodically stiffened. Occasionally convulsive paroxysms intervene between fits of rigid spasm, and in ten or twelve hours the animal dies. Occasionally, however, the affection,

though continuing longer, even to thirty-six hours, gradually subsides, the vigour of the constitution ultimately triumphing.

The treatment must consist in shelter or warmth, bleeding, purgatives, and opiates. Blood must be abstracted according to the age and strength of the animal; it should be placed in a genial temperature, and then undergo the action of aperients combined with opium. Castor oil, in doses of two ounces, with laudanum (tinct. opii) 1 drachm or 1½ drachm, in gruel, may be given to an adult sheep, and the castor oil or olive oil repeated, in smaller doses, every two or three hours until the desired effect is produced. After this, a cordial drink, consisting of gruel, ginger, and good ale, or a little gin, will often complete a cure. The fact is, that tetanus in the sheep is not so unmanageable or fatal as in the horse, or even in the ox; and in lambs undergoing the operation alluded to, the very circumstance of forcing open the jaws with the thumb, or of preventing their contraction by its introduction at the time, will prevent the muscular system generally from sympathizing with the muscles of the jaws—the latter being, as it were, the incitements to a similar spasmodic action throughout the frame.

Tetanus is a disease which ought very seldom to appear in sheep; it is the farmer's fault if it attacks his flock. The yearning ewes and young lambs should have due and sufficient shelter, and it is to be observed that it occurs chiefly among sheep and lambs exposed to the depressing cold of bleak unsheltered commons or heaths, during the early months of spring or the middle of winter. The stiffness which cold produces in the human being expiring on the snow, when he lies "stretched out and bleaching in the northern blast," may be regarded as arising from a spasmodic contraction of the muscles; and in like manner cold operates on other animals, producing numbness, torpor, stiffness, and death. Mr. Youatt assures us, that in travelling over some of the more open parts of the country on a winter's morning, he has seen in the space of twenty or thirty miles more than as many lambs stiffened by the cold. In these cases, gradual restoration to a genial temperature, perhaps the loss of a little blood, and a cordial, will restore the half-suspended animation. But what loss and trouble would not due sheltering places, as huts and the like, prevent!

True spasmodic tetanus may arise from causes which we cannot appreciate. Out of a flock of sheep grazing on the same pasture, one or more may be seized with this affection; so it is in the human being—tetanus often appears irrespective of any assignable cause. We know that under certain states of the nervous system a slight puncture or wound may produce it, but, as we have had occasion more than once to see, it occurs (to

use an expression indicative of our ignorance) spontaneously. Such cases however are not common, indeed they may be called rare; and among sheep, with a nervous system far, *far* less irritable than that of the human being—(a being exposed to mental irritation and anxiety, to noxious malaria, to the depressing influence of the atmosphere of factories, of cotton-mills, of lead works, and the like)—among sheep, we say, such a disease ought never to be known; at least, it ought to be of extreme rarity. We have never seen a case of tetanus either in the dog, the cat, or any of the canine or feline animals in the menagerie; indeed we may apply our observation to the *carnivora* generally, nor has the scope of our observation been limited. Mr. Youatt indeed, in his *History of the Dog*, speaks of tetanus as a disease to which this animal is occasionally liable, but so seldom that in the course of forty years' practice but four cases had come under his experience. Of these, one arose from a wound in the foot; the cause in the second case was not discoverable; in the third case no cause is assigned; but in the fourth, that of a bull-terrier injured in fighting, it might reasonably be attributed to wounds and terrible exertion. In the latter case calomel and opium were of the greatest service. On this subject however we must refer to the work in question. Mr. Blaine, it would seem, never met with tetanus, except in three instances, among many thousands of dogs diseased. Two of these cases were *idiopathic* (or spontaneous), the third was *sympathetic*, or *traumatic*, arising from extreme injury done to one of the feet: none were saved.

The French writers recount cases of tetanus in dogs, but their rarity on the continent appears to be the same as in our island. On the contrary, *chorea*, or St. Vitus' dance, an involuntary twitching or spasmodic action of some muscles, or sets of muscles, is by no means uncommon in the canine race, often degenerating into paralysis. But into this subject we have no right to enter; it is alien to our present subject.

EPILEPSY.

A disturbance of the action of the nerves (we must not here agitate the point with respect to this action, be it galvanic, or what it may) will often produce epileptic fits—the *morbus sacer* of the ancients. Young dogs in bathing are subject to epilepsy, so are the young of our race; and we have seen it produced in an adult by the horrid stench of the secretion which exudes from the subcaudal glands of the Grison (*Gallicitis vittata*).—See *Proc. Zool. Soc.* 1883, p. 140, et seq. In animals generally epilepsy results from high feeding and want of sufficient muscular exercise. We have seen domestic poultry fall down in epilepsy, and also caged birds, as canaries, &c., and it

often ends in true apoplexy, thus terminating existence.

Sheep are not unfrequently the subjects of epilepsy. It generally occurs within a few hours after daybreak, when the morning is fine but cold, principally in the spring and early part of the summer, and again in the autumn. The sheep rising from its bed (perhaps the grass of the field being covered with hoar frost) begins to stare, and stagger, and then fall, and struggle convulsively for several minutes. By degrees the fit subsides, and the animal recovers its feet, but still remains for some time in a state of semi-consciousness which gradually abates, and the faculties regain their usual equilibrium. These fits may recur every day, and if so a fatal termination may be predicted.

In some parts of the country the mode adopted in order to check the accession of the fit is to set a dog upon the semi-conscious animal, the worry of which, as has been remarked, frightens the creature not out of its senses, but into them. The terror excited interrupts the progress of one kind of nervous derangement by setting up another; but it is a cruel plan.

We recommend change of pasture, shelter, and a few doses of purgative medicine. When however habit has confirmed the disease, little hope of cure is to be entertained; the sheep wastes in flesh, however plump it might have been previously, and ultimately sinks, or dies apoplectic.

Prevention is better than cure; sudden change of pasture should be avoided, and sufficient shelter allowed.

We do not know that setons have ever been tried in the sheep as a counter-irritant in epilepsy, but we think they might be beneficial, assisted by moderate bleeding. Yet at the same time we would say that the farmer ought to look to the influencing causes of this disease, which disease when prevalent in his flock will not tend to his credit as a “keeper of sheep.”

PALSY, OR PARALYSIS.

Palsy or paralysis consists in a more or less complete suspension of the nervous influence on the muscles of voluntary motion. It may arise from many causes which exert a morbid influence on the nerves of motion, and it may vary in extent, from loss of power in a single muscle, to those of the limbs, or of the whole body. Pressure on the brain in consequence of a fracture of the skull, or of effusion of blood during apoplexy, disorganization of the brain from any cause, and pressure on the spinal chord, may produce a more or less complete paralysis. Disease of the motor nerves of a single muscle or of a limb will induce it. The

absorption of lead into the system, even through the skin (as in the instance of painters, and of that class of workmen who, in the potteries, are employed in dipping the earthenware in a liquid glaze containing lead), is followed by a peculiar species of paralysis, more or less complete. Paralysis in the sheep, however, seldom arises from these agents; it is generally the result of exposure to severe cold, and is often connected with rheumatism, and sometimes with other diseases.

Ewes enfeebled by yearning at an early period of the year, and left to take their chance in some unsheltered spot, should a severe frost come on, are often seized with palsy and deprived of all power of motion. The same thing occurs in the case of young lambs under like exposure.

If the palsy of the limbs be complete the animal rarely recovers, although it may perhaps drag on existence for a longer or shorter time. In other cases the muscles slowly regain a degree of power; but if they do, rheumatism too frequently supervenes, and the animal wastes away, and ultimately sinks.

In palsy, if extensive and complete, there is, as we have said, little hope of cure; but in milder cases relief at least may be afforded. The helpless animal should be removed to a comfortable shelter, and bedded upon straw, a small quantity of warm gruel with some ginger, or a little ale, may be administered, but more exciting stimulants will do mischief. Gradual restoration of temperature, and a gradual return of the nerves to their wonted functions, are the points to be aimed at. The lambs should be housed, their limbs rubbed at some distance from a fire, and warm gruel given to them. Should they recover the use of their limbs, they should be restored immediately to their respective parents, under shelter. It is however seldom that the lamb regains its due state of health and condition, and is therefore the more liable to the attacks of other diseases; indeed severe diarrhoea too often ensues, which is not to be arrested without difficulty. A cordial astringent commonly known as 'Calves' and Sheep's Cordial' will be found useful. It may be prepared as follows:—Take of

Prepared chalk, 1 oz.
Powdered catechu, $\frac{1}{2}$ oz.
Powdered ginger, 2 drachms.
Powdered opium, $\frac{1}{2}$ drachm.
Peppermint water, $\frac{1}{2}$ pint.

Mix well. Dose from one to two table-spoonfuls twice a-day. The mixture to be shaken each time it is to be administered. A little gum arabic or mucilage will tend to keep the chalk in some degree of suspension, but it is not absolutely necessary.

FEVER.

As is the case with horned cattle, sheep are liable to attacks of fever, and from the same causes. The first symptoms which attract notice are dulness, an indisposition to take food, a desire to rest alone apart from the flock in some sheltered or cool place, a weary gait, a distressed expression, panting of the flanks, a hurried breathing on being driven, redness of the eye, and dryness of the mouth. These symptoms are preceded by shivering, and if the disease be not speedily checked, it runs on into inflammatory fever; or the lungs or some vital organ will take on active inflammation, and all attempts to save the animal will be in vain. Many sheep, but more lambs, are yearly lost in consequence of neglecting this disease until it has assumed a violent character. "*Venienti occurrere morbo*"—*oppose disease on the outset*—should be the farmer's motto; when it once "gets ahead," who can say how it will terminate.

The first thing to be done is to remove the animal from the field to some quiet place, and then abstract a moderate quantity of blood, according to age, size, and strength; a dose of Epsom salts, two ounces for a grown-up sheep, dissolved in water or thin gruel, may be then administered, and repeated in a smaller quantity after the lapse of a few hours till it takes the proper effect. All stimulating or cordial drinks are poison here.

Should the animal improve, its diet must be cautiously attended to; it must not be put upon rich and nutritious food, as clover, turnips, and the like, but allowed the range of a scanty pasturage till its health is re-established. Even then its return to fattening diet should be gradual.

INFLAMMATORY FEVER.

This fever is similar to the *quarter-ill* of young cattle (see 'Ox,' p. 120), and is called by some *blood-striking*, a term also given to apoplexy, and indeed it is in apoplexy that this fever terminates so frequently.

It is generally while feeding in rich pastures, such as Romney Marsh, when the herbage is luxuriant and full of spring sap, that sheep are attacked by this disease, and the more liable to it are they if during the winter they are fed on scanty fare. The system will not bear the sudden change from starvation to luxury, and the slightest exciting cause, like a spark falling upon gunpowder, causes the explosion.

This disease commences with violent shivering of short duration, succeeded by a hot paroxysm of proportionate severity; the animal is languid and refuses food, it pants if driven, and lies down as soon as possible; sometimes it becomes restless,

its eyes are wild and bloodshot, delirium supervenes, followed by stupor, it lies down, resting the nose on the ground, the ears hang down, the eyes are closed and never again opened, the animal dies without a struggle. The disease runs a rapid course; a sheep may appear well in the evening and be found dead in the morning; but generally its period averages from sixteen to twenty-four hours. The urine is small in quantity and bloody, and there is violent stranguary. Sometimes instead of sinking into a gradual torpor the animal drops suddenly dead.

We have said that this disease is of common occurrence in Romney Marsh. The following account of its ravages, by Mr. Price, is appalling: "The number of animals that die of this disorder in Romney Marsh is truly astonishing; I should suppose nearly four in a hundred yearly in some soils and situations, and at peculiar seasons, although every precaution in stocking is taken to prevent it; which, if the graziers did not, they would lose half their flock annually. My opinion is, that the soil of Romney Marsh being very rich, consequently the clover and grasses equally so, that the sheep feeding on these rich pastures must be more subject to inflammation than those fed on poorer soils, particularly in the spring, when the young shoots of the grasses and natural clover are full of juices; besides, when in this state they are greedily eaten by the animals, which often proves fatal, particularly after a warm day or two. On opening them, the contents of the abdomen are more or less inflamed, and some parts are very dark coloured, and emit a very offensive smell. Sometimes the heart or lungs appear to be primarily affected, and sometimes the liver, bowels, and stomach, which is very easily perceived by the dark and livid appearance of the part. It is said that bad mouthed sheep never die of this disease, because they cannot feed on short nutritious grass, but on coarse long herbage, which does not enrich the blood. I am of opinion that it is an inflammatory disease, and that the only remedy is large bleedings, so as to rapidly lower the system."

As this fever depends upon repletion of the blood-vessels, brought on by too sudden a change from low to rich fare, the main chance of saving life will be by the prompt abstraction of blood in an early stage, before any congestion of the brain or of any of the viscera of the chest or abdomen has taken place; afterwards active purgatives must be given and the pasturage changed. There must be no delay—a quarter of an hour may make all the difference.

This disease, or one very similar to it, is common in some parts of France, generally ravaging the flocks in the latter part of spring and through the summer months till August. It is called *La*

Maladie de Sologne, from the name of the district in which it prevails.

La Sologne is a low marshy district in Orléanais, abounding in small lakes and pools of water, and yielding in spring and early summer a luxuriant vegetation and a profusion of aquatic plants. If the month of April be rainy, the disease is sure to break out shortly afterwards, and thin the flocks. During the autumn and winter the sheep are half starved; the fields are bare, and rushes and the dead leaves of trees constitute their wretched fodder. After the spring rains the vegetation starts up and assumes a luxuriant aspect; the fresh grass is rank and succulent, and the half-starved sheep devour it greedily. Disease is the consequence of this sudden repletion; nor is it only the adult sheep that are thus attacked, the lambs are not exempt. Born of emaciated feeble ewes early in the spring, what can be expected but that they should be puny and weakly? The mothers yield but little milk of poor quality, and even of that milk the starveling lambs are not allowed half, a great portion being abstracted in order to make a villainous sort of cheese. The sheep-houses in which the ewes with their young are driven at night are damp, low, completely closed, and oppressive, and the little fodder allowed is the vilest trash. It is little therefore to be wondered at, that when the green herbage springs up both sheep and lambs should gorge themselves on the rank vegetation. The disease is now rife. "Its early symptoms are—suspension of rumination, loss of appetite, dulness, weeping from the eye, coldness of the ears, alternate shiverings and flushings of heat. Soon afterwards the mouth and the breath become hot, the eyes are red, the pulse is accelerated, weak, and irregular; there is a mucous discharge from the nostrils, this soon becomes bloody, and then mixed with purulent matter and blood. By degrees the urine becomes bloody, and the dung is covered with grumous blood; the head and the legs are swelled, the debility is extreme, and the animal dies in the course of eight or ten days." Few individuals survive; those in the best condition and those previously out of health are sure to fall; but lank sheep, if otherwise in good health, sometimes struggle through. M. Tessier affirms that he has little faith in any medical treatment; the farmers give dry food with salt, camphorated drinks, and various vegetable tonics.

It would appear that this fever of *Maladie de Sologne*, after the inflammatory stage, assumes a typhoid character; in this latter part of its course nothing can be done, but perhaps at the commencement of the inflammatory stage bleeding and purgatives, with dry food, might prove, often at least, successful.

The appearances after death are described as

follows:—"The mesenteric glands are usually enlarged; there is effusion to no great extent of bloody serum in the thoracic and abdominal cavities; little affection of the small intestines, but the large ones exhibit spots or patches of inflammation and extravasation; the liver enlarged, and having vesicular accumulations of thick red fluid on its surface. The lining membrane of the air-passages is red, the passages themselves filled with a bloody spume or with pure blood; the surface of the lungs covered with ecchymosis; and the right ventricle of the heart usually inflamed."

The directions given by M. Tessier relative to this disease are preventive—viz., to keep the flock in the sheep-house as much as possible during the rainy season; to feed the pregnant or suckling ewes upon better provender; to abandon the system of milking them; to abstain from turning the lambs into those marshy situations on which the farmer is afraid to place the mothers, in consequence of the danger to which they are there exposed of being affected by the rot; to keep salt within the reach both of the ewes and lambs; to avoid sending the sheep to field when the weather is cold, and to drive them back to shelter when storms threaten; not to shear the sheep so early as is customary; and to endeavour by every possible means to drain the ponds and marshes with which Sologne and so many other districts of France abound.—*Tessier, Instruction sur les Bêtes à Laine.*

BRAXY—TYPHUS FEVER OF YOUATT.

A highly febrile condition, depending upon the acute inflammation of some of the viscera, often rapidly assumes a typhoid form; hence Mr. Youatt terms it *typhus fever*, and he rightly observes that it is common in Scotland, where, with other similar diseases, it has the general appellation of braxy. This term, the true meaning of which is not very palpable, is, as we have said, applied to several inflammatory affections. *Water braxy*, for example, is inflammation of the serous membranes of the abdomen, ending in the effusion of bloody serum. *Dry braxy* is inflammation of the mucous membrane of the stomach and bowels, and is very rapid in its progress, often destroying life within a few hours of the symptoms being observed, so suddenly does the inflammatory action prostrate the vital powers, so quickly do the typhoid symptoms succeed those of burning fever. This is the *typhus fever* of Youatt. It is most prevalent in autumn, as the food becomes scanty, and the sheep resort to dry, harsh, and indigestible aliment, at the same time that they are exposed to cold and wet, bleak winds, and driving sleets. Mr. Spooner says that *dry braxy* is produced often by rank grass and rotten leaves. The symptoms, he says, are a quick pulse, hurried breathing, the

mouth and skin hot, the wool clapped, the belly sometimes swelled, and the bowels confined.

The celebrated Ettrick Shepherd and Poet, Mr. Hogg, was well acquainted with this form of braxy. According to his observations, loss of cud, or the arrest of rumination, is the first symptom to be noticed; soon the animal exhibits signs of great internal agony, it stands with the back bowed and the four feet brought all closely together into the smallest compass, it grinds its teeth, it is uneasy in every posture, it lies down, and in a few minutes gets up again, and again lies down to rise up and re-assume its cowering attitude, it bleats from the violence of the pain, and creeps into some retired spot away from its companions. The eyes are heavy and dull, and the countenance is expressive of great suffering. The ears hang down, the mouth is dry, and the inside of it, or of the lips, or of both, is covered with pustules or ulcers. The pulse is full and quick at first, but it soon assumes the character of debility, and great prostration of strength rapidly supervenes. The urine is high coloured, the dung covered with fœtid mucus, and the breath most offensive. Mortification has now commenced, the agony ceases, and the poor animal is destined to a speedy death.

On dissection the appearances are various, but in all cases decomposition is rapid. Generally the heart is found gorged with black blood, the lungs are gangrenous, and often the liver enlarged and putrid; the mucous or lining membrane of the alimentary canal evinces active inflammation throughout the whole of its extent, the fourth stomach is often mortified, and the smell of the contents is horrible. The body emits a strong sulphurous odour, and the flesh has been frequently known to engender disease in animals that have eaten it.

Prevention is here important, and the rules laid down by Mr. Hogg in his *Mountain Shepherd's Manual* are well worthy of attention, especially by the Scottish sheep farmer, among whose flocks the disease is most prevalent: many of the observations indeed are generally applicable.

To obviate the causes of this disease, it may, he says, "be probably advisable to smear the hogs a month or six weeks earlier than the rest of the flock. This will operate in two ways—first, it will defend the animal from wet and cold; and next, the irritation excited in the skin by the smearing stuff, if containing tar or turpentine, contributes to remove any tendency to inflammation from the internal parts. This is a circumstance perfectly understood by medical men, who in ordinary practice apply stimulating matters to the skin for this purpose; and it is in this way that blisters act.

"As about the end of autumn the vegetation of the grasses becomes feeble, and the leaves become

soft, and in moist weather rot, it will be of importance to keep the sheep away from the richer pastures until the decayed leaves become dry. And in order to reduce the pasture to a proper state, it may be useful to allow old sheep to graze upon it for some time previous to the hogs being put on, and thus the grass will become short and free from rotten leaves. This will have another advantage; it will prevent the hogs from filling their paunches too rapidly. They should be driven from the succulent pasture to that which is drier every night. The value of turnips, alternating with dry heathy food, is immense in preventing the destructive disease. Four or five hours on turnips in the twenty-four is quite sufficient.

"It has been observed that this disease appears earlier in the season on lands where the grass has been preserved, and at a later period where it has been regularly depastured. It ceases when winter sets in, but appears again in the spring. It is most prevalent where the ground is dry, and the heath mixed with fine grass, and especially where fern grows in abundance. Sheep feeding on strong clay land are not apt to be affected, and the same may be said in respect to mossy soils which carry evergreen plants."

With respect to the mode of cure—in this disease, unless remedial measures be resorted to in the early stage, there is no hope. The lancet and Epsom salts are the chief dependences: blood must be taken, and purgatives administered without unnecessary delay. Mr. Hogg in the *Manual* quotes some cases forwarded to him by Mr. Stephenson, a surgeon, in some of which his mode of treatment proved successful—out of twenty-five cases sixteen recovered, nine died. His plan was to bleed by free incisions across the tail, in the eye-vein, in the jugular, in the limbs, or in fact wherever blood could be obtained: after this, Glauber salts (1½ ounce) were given in warm water; and where these could not be obtained, a handful of salt, by means of the spout of a common tea-pot. The diet consisted of meal and water, and boiled hay.

We may select two cases by way of example:—

"On the 7th of December, 1804, another sheep was brought home. The shepherd had seen it affected in the morning, but it was not brought home till dinner on account of the distance. When brought home it could not stand, which we attributed to the tying of its legs for the purpose of being carried home a distance of nearly four miles. The eye was dull, wool clapped, pulse quick and strong, mouth dry, and a kind of palpitation at the heart. The urine was red like blood. On cutting the tail, two or three drops of blood only, black and thick like tar, followed the incision, which, however, soon stopped. The vein on the inside of the fore-leg was opened, from which also

no more than two or three drops came, of the same black and grumous appearance. The ear was also cut in the inside, but little or no blood came from it. An ounce and a-half of Glauber salts were given in a pint of warm water, and an old blanket thrown over it. In three-quarters of an hour the tail was bleeding very freely, but the other places had stopped. The animal was lying down, and could not rise. The pulse was quick, and it was apparently very sick. In the evening, about two hours after, it was much in the same way, only the skin was not quite so hot. It got a little meal boiled in water, and the blanket was left on it during the night. On looking at it next morning, it was risen, but scarcely able to walk. The tail had bled a considerable quantity, and it would not eat. The wool was clapped to its body, and it still had a very languid appearance, probably from the blood it had lost. It got a little more boiled meal and water, and the salts operated. In the afternoon it was eating a little boiled hay, and from this time gradually recovered, without any other application. It continued very weak for about eight days, when the wool was risen to its usual appearance, and it was sent to join the flock."

"On the 14th of November, 1803, a young sheep was observed affected with *sickness* (as braxy is in some parts termed). It belonged to a friend of a mine; during the time I was on a visit to his house. He had ordered it to be killed, alleging that *sickness* was uniformly fatal, but was easily persuaded to try something for its relief, as, if it succeeded, it might be advantageous in cases of a similar kind. The appearance of the sheep upon viewing it was by no means favourable for a trial. The wool was clapped, the eye was red, the pulse strong and full, the skin very hot, breathing laborious with considerable wheezing, and it was scarcely able to stand. The belly was somewhat swelled, and the mouth quite parched. It was bled in the tail, neck, fore-leg and hind-leg, belly, and ear, from which there was a little blood got of a dark colour. As no Glauber salts could be had, a handful of salt was given to it dissolved in a teapotful of warm water, and it was left in a house by itself. In half an hour it was found lying down, and we thought it dying. On going to it, it rose, but could not walk. The tail was bleeding pretty freely, and the blood flowing from it was rather of a redder colour; the pulse was quicker, but not so strong; and the other wounds had bled a little. The symptoms were not increased, but it did not seem better.

"As there happened to be some saltpetre or nitre in the house, we gave a teaspoonful of it in another teapot of warm water, but reserved the half, which was afterwards given at the interval of an hour, when the heat was rather less,

and the skin somewhat moist. At the end of the second hour, it had passed a considerable quantity of urine, and seemed rather more relieved. In two hours more the salt had operated, and the wound still continued dropping. It got a large teapotful of meal and water. Next morning it looked much better, but would not eat. In the afternoon it ate a little boiled hay, which it lived on for two days, when it was put into a park by itself. In two days more it was sent to join the flock."

These two cases are sufficient to illustrate the mode of treatment pursued, and they serve to show that, if the disease be taken in time, the chances in favour of cure are more than equal—perhaps three in five.

In Sir Walter Scott's novel of *Redgauntlet*, Summertrees speaks of being fed by the shepherds, after his singular escape from the military, upon bear-meal scones and braxy mutton; and the writer adds in a note—"Braxy mutton, the flesh of sheep that has died of disease, not by the hand of the butcher. In pastoral countries it is used as food with little scruple." Is there not some slight mistake here? Should it not be, the flesh of sheep which, showing decided symptoms of disease, are at once killed by the shepherds for the sake of the mutton?

WATER BRAXY, ACUTE DROPSY, OR REDWATER.

This disease is essentially inflammation of the serous membranes of the abdomen, or chest, or of both, terminating speedily in effusion and death. From the colour of the serous effusion, which is stained blood, it has obtained the name of *red water*. Lambs are particularly liable to its attack, and most so in the autumn and early part of winter, and also soon after they are yeaned, especially during cold wet weather, and in damp situations. Sheep when first put upon turnips are also subject to it, and so rapid is its progress, that a sheep exhibiting nothing wrong in the evening, may be found lying dead, in the natural attitude of sleep, when the shepherd visits his charge in the morning. On dissection the peritoneal membrane, and perhaps also the pleura and pericardium, will be found in a state of high inflammation, and the abdominal cavity, and the chest and pericardium, filled with a red serous effusion. We may attribute the cause to a sudden change of pasture, from a dry soil to a cold and wet one, on which, having taken a new and rich kind of food, the animal lies down to ruminate. The peritoneal coat becomes chilled, reaction follows, and runs on to inflammation, which rapidly produces effusion and death.

It is not always, however, that the course of this disease is so rapid, or that no precursory symptoms are manifested. It frequently happens that

a sheep indicates by its actions that this disease is commencing. It is dull and listless, it lags behind its companions, it stands with its head stretched out, and its flanks tucked up, as if labouring under great pain; its breathing is difficult, sometimes the bowels are constipated, at others unnaturally purged. Soon the abdomen begins to swell—the animal evinces its great uneasiness by repeatedly lying down and getting up, or by rolling on the ground; the effusion proceeds, the breathing is laborious, and soon ceases.

It is only at the commencement of this disease that there is any chance of success. Bleeding, followed up by aperients, warm fomentations to the abdomen, and shelter from cold with a change of food, are the means to be resorted to. It must be confessed that the chances of cure are very slight, and it is perhaps the farmer's best plan, on the first appearance of the symptoms of acute dropsy, to slaughter the animal at once. These symptoms, however, are obscure, they are not readily to be distinguished from those of other inflammatory diseases, particularly at their commencement; but when one sheep in the flock has died, and of this disease, as ascertained by examination after death, the farmer may be pretty sure that others will follow, and should watch diligently, and save the flesh of the sheep or lamb by immediate slaughter. At the same time, let him change the situation and diet of the flock, and give them shelter.

Acute dropsy, as it may well be termed, must not be confounded with that species of dropsy which is the consequence of general debility, or the result of chronic or slow and insidious diseases—as inflammation of the liver, chronic *enteritis*, and even of old age itself. In these cases, there is not only abdominal dropsy, but the skin of the jaws and legs becomes anasarcaous, indicative of the failure of the vital energy of the system. We know not that anything can be done in such cases; it will be right to keep up a moderate action of the bowels, and administer tonics, as gentian and ginger. Some have recommended tapping by means of a trochar, but we place no faith in any medicines or in any operation.

COLIC.

Colic is a spasmodic, not an inflammatory, disease, but we here advert to it, as it has to be distinguished from *enteritis* or inflammation of the bowels. It is rare in adult sheep, but in the winter house-lamb over-crammed with milk, and in the grass-fed lamb liable to crop rank or acrid herbage, it is not unfrequent. The lamb moans, is restless, strikes at the sides of the belly with its hind feet, and seems distressed with pain. An aromatic purgative, composed of an ounce of Epsom or Glauber salts, with two scruples of ginger, and thirty drops of laudanum, may be made up into a

drench with good peppermint water, and given as soon as possible. Soon after this warm gruel should be administered; and if in a few hours the bowels are not relieved, the aperient drench should be repeated. In the meantime, the bowels should be fomented and the animal kept comfortably warm. Strangulation of the intestines from violent spasmodic action, or intussusception, have, we believe, never been observed in the sheep.

ENTERITIS, OR INFLAMMATION OF THE BOWELS.

Sheep, owing to cold, wet, improper food, and other causes, are liable to inflammation of the bowels, or rather of the peritoneal coat of the intestines, which, if not relieved, will terminate fatally. The symptoms are—shivering, fever, a small quick hard pulse, obstinate constipation, and violent agony. The animal stamps, it strikes its sides with its hind feet, it paws the ground, it attempts to lie down, but the pain produced on the attempt renders it irresolute or checks it; perhaps in despair it throws itself down, then rolls on its back, again scrambles up with a violent and painful effort, and looks wild and distracted. Gradually it begins to waste away, and soon dies. Occasionally it becomes delirious, the pupil is widely dilated, and the brain is evidently in a state of congestion. After death, the intestines will be found highly inflamed, portions of them will be adherent or agglutinated together; patches of gangrene are often numerous, and there is generally an effusion of limpid serum, or of offensive purulent matter. Dry hard layers of food are frequently found in the maniplus, and the lungs are congested with blood.

Prompt and active treatment in the early stage is imperatively demanded. This consists in the abstraction of blood according to the strength of the sheep, and in the persevering administration of purgatives until the bowels act freely. When this is effected by Epsom salts, their action may be kept up by sulphur in ounce doses. The food should consist of mashes and gruel. Fomentations are useful. As soon as the bowels begin to act freely, a grain or two of opium in gruel will be advisable, as tending, by mitigating the pain, to subdue the violence of the inflammation.

It will be here at once perceived that enteritis and acute dropsy are closely-allied diseases. In the latter, it is the mesenteric and the omental portions of the peritoneal membrane, and its reflexion over the abdominal muscles, that are the chief seat of the violent and excessively rapid inflammation. In enteritis it is the peritoneal coat investing the intestines themselves, together with the muscular layer beneath, to which the inflammation is chiefly confined. Hence, in the acute dropsy, the more extensive serous effusion, and perhaps the less degree of intense agony, than is

endured in enteritis. In enteritis we have adhesions, ulcerations, gangrene, and effusion but not to a large extent, and often much mixed with purulent matter; in acute dropsy, excessive effusion of sanguineous serum. In both the principles of treatment are the same.

DIARRHŒA.

By diarrhœa we mean simple purging, arising either from a relaxed state of the mucous membrane of the alimentary canal, or from the presence of some acrid or irritating matter in the bowels, which nature thus makes an effort to get rid of. Many persons confound diarrhœa with dysentery; and it is true that the former, from the persistence of irritation, may run into the latter, but dysentery commences as a febrile disease with inflammation.

Diarrhœa should never be neglected. It either indicates debility or improper food, and in lambs often terminates fatally, beginning as simple purging, but ending in serious disease of the mucous membrane. It arises from cold, from acrid food, as rank grass, or even from an unhealthy condition of the parent's milk. It is common at weaning time. Now the farmer must not be alarmed when he finds his lambs simply purged; because, as we have said, it is often nature's own remedy; but he should watch them, and if it becomes immoderate, continues beyond twenty-four hours, is attended by griping pains and a discharge of mucus, he should immediately take steps to allay it. Change of food is one step, warmth and shelter another, and doses of the mixture termed 'Sheep and Calves' Cordial' will mostly prove beneficial. A weaning lamb should not be put incautiously upon rich succulent grass, for such diet may not only produce diarrhœa, but other diseases; and when from this cause diarrhœa supervenes, the removal to a paddock or field of close-cropped herbage on a dry soil is essential. In suckling lambs, it is perhaps advisable to remove them from the ewes, and substitute boiled cow's milk for that of the natural mother, the doses of cordial being given once or twice a-day.

With respect to full-grown sheep, the same observations relative to pasture will apply. Diarrhœa is a spring affection, generally speaking, occasioned by the new succulent grass, and need not, unless severe, be checked; but if severe or continuous, then the change of pasturage is necessary. Hogg says, "Purging seldom proves fatal to sheep. It is sometimes of service to their general health, and ought never to be stopped too soon. But this complaint sometimes proceeds so far as to bring on great debility if its violence be not checked. When the flux is moderate, change of diet from soft to dry food for a few days may

effect a cure; but if the purging be considerable, a quarter of an ounce of prepared chalk may be given in an English pint of cow's milk, a little warmed. The dose may be repeated at the end of two days, if symptoms of amendment have not appeared. If the purging be very violent, and attended by straining, the first dose should be a drachm of rhubarb, and, after it has operated, chalk may be given. When cured, the animal must be gradually accustomed to its pasture, otherwise the rich tender grass may occasion a relapse."

In addition to the chalk, it may be well to give with it a grain or two of opium.

DYSENTERY.

Dysentery consists in inflammation of the mucous membrane of the intestines, producing not only an increased secretion of mucus, but a morbid alteration in its character; and consequently it differs essentially from diarrhoea, which is a natural effort to relieve the bowels of irritating matter.

Nevertheless, dysentery often commences insidiously; it may result from neglected diarrhoea, but it oftener commences as dysentery from the first, and so runs its course. It is produced by cold, bad food, neglect, and ill-management. It begins by febrile symptoms and purging, quickly inducing emaciation. Generally the appetite fails, but occasionally there is a morbid desire for food, to the digestion of which the stomach is unequal. The alimentary discharge is thin, slimy, adhesive, bloody, and offensive, often intermixed with hard lumps. The abdomen is tender, even painful. The countenance is distressed, the back of the thighs are plastered by coatings of the slimy evacuation, the animal pines, its flesh wastes away, and it becomes a piteous object. Some cases terminate fatally in a few days, in others the wretched creature wears on for three or four weeks before death terminates its sufferings.

In the treatment of this disease much caution is required, and at the same time the plan ought to be decided. If there be considerable fever, and in the early stage the febrile action is generally considerable, blood ought to be abstracted according to the strength of the sheep; then, strange as it may seem, aperient medicine should be administered, for the bowels must be unloaded of their offensive morbid secretion. A good aperient in this case may be made up as follows:—

Linseed or castor oil, 2 ozs.
Powdered opium, 2 grains.
Linseed tea, $\frac{1}{2}$ pint.
Mix.

Some prefer half a drachm of rhubarb, an excellent medicine, as it acts, in a secondary way, as a tonic and astringent; others give salts, but a

combination of these with rhubarb would be preferable.

In the meantime the animal must be put upon a diet of mash, gruel, and a little hay.

Suppose the medicine to have acted (clearing the bowels of their disordered contents), and the fever to be abated, what is the next step? Gentle astringents with opium. Among these the 'Sheep's Cordial' is one of the best preparations, and afterwards, as a restorative, doses of gentian and ginger may be given.

Before however astringents are given, it may be necessary, the fever continuing, to keep up the now *natural* action of the bowels; for this purpose, ipecacuanha, in doses of five or six grains, has been found very efficacious. Some practitioners however give sedatives, and follow them by oleaginous aperients.

Mr. D. Sayer, in some cases which came under his experience, as quoted by Mr. Spooner, after administering an oleaginous purgative, gave on the following day the subjoined mixture:—

Powdered opium, 2 grains.
Powdered ginger, $\frac{1}{2}$ drachm.
Powdered gentian, $\frac{1}{2}$ drachm.
Linseed tea, a small quantity.
Mix.

This was administered twice. On the subsequent day it was repeated once, with the addition of half an ounce of linseed oil. The plan was persevered in for a few days with the best results. By these means he succeeded in restoring many sheep, which gradually returned to their former diet.

Mr. Hogg quotes some cases, in his *Shepherd's Manual*, the general treatment of which we may here briefly detail, observing by the way that he applies the term *braxy* to dysentery as well as acute dyspepsy.

In the first case, after bleeding from one of the veins of the fore-leg, an ounce of Epsom salts was administered, which operated in eight hours; the pain in the bowels seemed to be abated. Next, five grains of ipecacuanha were given every two hours, for five hours, which kept up the purging, and produced nausea. In two hours after the operation of the ipecacuanha the animal began to eat a little, and the skin was somewhat moist; the purging now abated, and in six days the sheep was able to join the flock.

In the second case, the lancet was not used, but a dose of half a drachm of rhubarb was given, which operated several times; the next day, eight doses of ipecacuanha were given, one every two hours. The purging continued, but not so much blood or slime, for two days, at the end of which infusion of logwood was given. It was made as follows:—A Scots pint of boiling water was poured upon four ounces of logwood, and left to stand for twelve hours; of this four ounces,

with fifteen drops of laudanum added to it, was given every morning and evening.

In six days the bowels were restored to their natural action, the fever had disappeared, and in a few days afterwards the animal returned to the flock.

In the third case the disease had already continued twelve days, the wool was clapped, the alvine evacuations were mixed with much blood, the animal was exhausted, but in a state of fever. An ounce of salts was given, which operated well. Next day four doses of ipecacuanha of four grains each were given, which also operated, clearing the bowels of much hardened matter mixed with blood. Still, though the purging was abated, there was no appetite, and the fever continued. Two ounces of logwood were infused in a quart and a half of water, and of this infusion four ounces were given three times a-day with fifteen drops of laudanum. This was continued for four days, during which time blood and purulent matter were discharged. On the seventeenth day from the first attack the sheep died.

On opening the abdomen the bowels had all an inflamed appearance, and a considerable portion of the lower intestine was ulcerated in the inside, its coats were thickened, and its outside was of a blackish hue. There was a quantity of fœtid air in the bowels which turned a silver probe quite black, as it did also a shilling exposed to it. The flesh was soft and red, but the heart, liver, and brain were sound. The kidneys were slightly enlarged and flabby.

We may here observe, that ulceration of the mucous membrane of the intestinal canal is a common and ordinary result of continued dysentery, and in such a case astringents will be injurious rather than beneficial; nor ought saline aperients to be administered; they should be oleaginous, combined with opium; injections of starch with a few drops of laudanum will also mitigate the distressing symptoms; when ulceration however has taken place, which may be known by the discharge of purulent matter mixed with blood, there is but little chance of effecting a cure.

One medicine, of great importance to the practitioner in cases of dysentery in the human subject, does not appear to have been tried on the sheep; we allude to calomel. This mercurial preparation has been given, combined with opium, to the ox with advantage (see 'Ox,' p. 136), and might be equally useful to the sheep. The dose would be from five to ten grains, with two grains of opium, mixed in thick gruel; an hour or two afterwards an oleaginous aperient should be given, and the bowels being cleared of all indurated matter lodging in the large intestines, soothing and gently astringent remedies should be then employed. We doubt the wisdom of giving strong

astringents too early, and we consider that emollient injections, as starch, gruel, or linseed tea, with laudanum, have been too much neglected. Where the febrile symptoms run high, the disease being in its early stage, bleeding is indispensable.

Our plan then in *Acute Dysentery* would be—bleeding, in order to lower the inflammatory action; calomel and opium, to alter the morbid character of the secretions, whether biliary, pancreatic, or intestinal; oleaginous aperients, to remove all offensive irritants; gently astringent and emollient medicines, in which opium constitutes an essential ingredient, aided by injections also containing opium, of which lukewarm starch is the best. In *chronic* cases, the bowels being as yet un ulcerated, more decided astringents may be employed with advantage.

THE ROT, AND INFLAMMATION OF THE LIVER.

Sheep are subject both to acute and chronic inflammation of the liver, and this inflammation is in its simple state not only often fatal, but it is too frequently the foundation of that destructive pestilence, the rot.

Excess of nourishing food, undrained marshy grounds (*saline* marshes excepted), and causes not easily understood, produce inflammation of this viscus. In acute inflammation there are decided febrile symptoms; the sheep is dull, it hangs its head, it is unwilling to stir, it heaves at the flank, and the bowels are usually confined. The skin assumes a yellow tinge, the eye is suffused with the same colour, and particularly the caruncle or small glandular body at the corner of the eye. The animal when pressed on the right side shrinks with pain, and the right fore-leg exhibits a peculiar lameness. If this disease be neglected it may run a rapid course, and end speedily in death; but it may assume a chronic form, and produce slowly or more quickly extensive disorganization of the substance of the liver, and the numerous evils attendant thereupon, and this we regard as the *rot*.

There would seem to be a peculiar tendency to inflammatory and morbid action in the liver of the sheep; * indeed inflammation sometimes appears as an epidemic, especially in certain parts of France and Holland, where salt is given, both by way of prevention and cure.

The treatment of acute inflammation of the liver consists in bleeding, saline aperients, a spare diet on dry food or short grass, removal from luxuriant pasturage, and salt to lick.

With respect to that low, chronic, insidious inflammation which produces rot, we shall be able better to understand it, by treating it under that head.

* The liver of the sheep is proportionally larger than that of the ox, and double the proportionate size of that of the human being.

Rot is a disease which not only ravages the flocks of our island, but those also of France, Holland, Germany, Norway, North America, and even Australia and Van Diemen's Land. It has been known from the earliest times, and history recounts the ruinous destruction which it has made from time to time among the sheep of various countries. Mr. Youatt calculates that in our country more than one million of sheep and lambs die every year from this disease. "In the winter of 1830-31, this number was far more than doubled, and had the pestilence committed the same ravages throughout the kingdom which it did in a few of the midland, eastern, or southern counties, the breed of sheep would have been in a manner extirpated."

This horrible malady, the rot, comes on insidiously—the first symptoms are obscure; the sheep feeds, and what is more, rapidly gains flesh; nevertheless it is dull, and this circumstance excites the suspicions of the experienced farmer. He looks at the skin of the animal, and especially on the brisket; he finds it, instead of being of a clear pinky colour, of a pallid yellow tint. He looks at the eye; the fine vessels seem injected with a yellow fluid, and the caruncle, which ought to be red, is of a yellow colour also. There is no doubt about the matter, the sheep has the *rot*—the liver is diseased, the bile is absorbed into the system, and is beginning to mingle with the blood.

Though at first, probably from the stimulating effects of the bile on the system, the sheep rapidly accumulates fat,* this state of things cannot and does not last. In a short time the sheep begins to lose flesh, and quite as rapidly as he gained it; the yellow tinge of the skin and eyes is more decided, it spreads over the muzzle, and dyes the fevered tongue; soon the muzzle, the tongue, and the eyes become of a livid yellow, and the breath is disgustingly offensive; sometimes excessive diarrhoea prevails, sometimes on the contrary the bowels cease to act, livid spots or patches appear on the skin, it hangs loose and flabby on the emaciated frame, and air becomes infiltrated into its cellular tissue—it crackles when handled; the wool falls off, or is disengaged with the slightest force, the abdomen begins to be filled with a serous effusion, dropsy is coming on, the skin about the jaws and throat is filled with serum, the animal trembles in every limb, it is wasted to a skeleton, and so dies.

With respect to the duration of this disease,

* This was well known to Mr. Bakewell, for when he wanted to prepare sheep rapidly for the market, he used to overflow some of his pastures, and when the water was run off, to turn the sheep upon them. They speedily became rotted, and at the same time accumulated fat with wonderful rapidity. By this manoeuvre he would gain five or six weeks on his neighbours. How far he was justified in this plan is another matter. We think he was not. But a person who relishes the diseased livers of geese in pastry, *pâtés de foie gras*, cannot object to the flesh of a jaundiced sheep, with pale flabby muscular fibres, and greasy yellow fat.

it varies from two to four, and sometimes even six months.

The following admirable account of a post mortem examination of a sheep which has died of the rot, by Mr. Youatt, who spent a life of observation and practical dissection, is too valuable to be omitted.

"When a rotted sheep is examined after death, the whole cellular tissue is found to be infiltrated, and a yellow serous fluid everywhere follows the knife. The muscles are soft and flabby; they have the appearance of being macerated (soaked in water). The kidneys are pale, flaccid, and infiltrated. The mesenteric glands enlarged and engorged with yellow serous fluid. The belly is frequently filled with water or purulent matter. The peritoneum is everywhere thickened, and the bowels adhere together by means of an unnatural growth. The heart is enlarged and softened, and the lungs are filled with tubercles. The principal alterations of structure are in the liver. It is pale, livid, and broken down with the slightest pressure; and on being boiled it will almost dissolve away. When the liver is not pale, it is often curiously spotted. In some cases it is speckled like the back of a toad, nevertheless some parts of it are hard and schirrous; others are ulcerated, and the biliary ducts are filled with *flukes* (*Distoma hepaticum*, Rudolphi. *Fasciola hepatica*, Linn.) Here is the decided seat of the disease, and it is here that the nature of the malady is to be learned. It is *inflammation of the liver*. In consequence of this, the secretion from the liver is increased; at first scarcely vitiated, and the digestive powers are rendered more energetic, but soon the bile flows so abundantly, that it is taken into the system, and the eye, the brisket, and the mouth become yellow. As the disease proceeds the liver becomes disorganized, and its secretion more vitiated and even poisonous; then follows a total derangement of the digestive powers. The whole system sympathizes; every viscus of the chest and abdomen is gradually involved, and the animal exhibits at its death a general state of disorganization which accompanies scarcely any other malady."

Not only does the liver evince the ravages of inflammatory action, but also of the thousands of *flukes* or parasitic worms which crowd its ducts.

Much has been written respecting these *flukes*, some contending that they are the origin of all the mischief in the liver, others that they merely find, however they get there, an appropriate nidus in the ducts of the diseased liver in which to develop, and that, though always present in such a liver, they rather accompany than cause its morbid actions. The latter, we confess, is our own opinion, and we may apply to them the same observations which we have already applied to the hydatid, although, in the case of the latter, its

growth is at the expense and wasting of the brain. We deny not that these flukes may aggravate the disease; indeed, from the perpetual irritation they must keep up in the biliary passages and canals, the smaller of which they block up, swimming even against the stream, it would be marvellous if they did not aggravate it; but they are not the original cause of it. As to their introduction, the same theory which we ventured upon relative to the hydatid is applicable to those parasites, which breed and multiply in the liver to an astonishing extent. It is not only in the liver of sheep that flukes are found. They exist in the liver of other ruminants, as of deer, oxen, &c., and also in that of the rabbit, an animal subject, like the sheep, to the rot, when fed upon improper and watery food; in the biliary ducts of the horse, the ass, the dog, and sometimes, it is said, in the gall-bladder of the human subject.

The fluke (*Distoma hepaticum*, *La douve* of the French, *Leberwurm* or *Leberegel* of the Germans, *Leverworm* of the Dutch, *Faarestynder* of the Danes, *Bisciuola* of the Italians) belongs to a section of the *Sterelmintha* or *Parenchymatous Entozoa*, termed *Trematoda* (*Cuv. R. Anim.* vol. iii. p. 262), distinguished by the presence of cup-like suckers on the under surface of the body, by means of which they attach themselves. Rudiments of nerves are apparent.

The fluke is about an inch in length, and resembles a sole in miniature, with the fins cut off. The head part is prominent, and the mouth is surrounded by a sucker. A second sucker is placed on the under surface of the body. By these suckers it secures itself in the biliary vessels, where it takes up its abode. The mouth of this sole-like parasite opens into a tube or the œsophagus, which immediately divides into two nutrient branches (apparent to the eye when filled, as they generally are, with dark bile), giving off numerous ramifications along each side. A very minute nervous ganglion appears on each side of the tube or œsophagus, sending nervous filaments to the anterior disc, and a nervous thread across the œsophagus, which runs on each side downwards, in a serpentine manner, towards the tail, where it is lost.

The fluke is bi-sexual, like the slug, and it appears most probable, as in that animal (to judge by the anatomy), that the co-operation of two individuals is necessary for mutual fecundity. Such is the case in the allied *Planaria*, a native of stagnant waters, where it may be found creeping like a minute leech on the stems of aquatic plants.

The ovaria occupy the entire circumference of the body, and, when replete with ova, are very apparent. These ova have been found in the biliary ducts and the gall-bladder in vast numbers,

resembling fine grains of sand. Multitudes pass into the intestines, and are carried away with the excrement; but what then becomes of them, whether they perish or are vivified, and if the latter, what the form is which is assumed, and where the beings take up their residence, are points buried in utter obscurity.

If, then, we regard the presence of flukes in the liver (however they may aggravate the disease) as the consequence and not the cause of rot, to what are we to look as the influential origin of this direful malady? Could we ascertain this, we might perhaps have the means of prevention in our power. Much has been said and written on the subject, but, after all, we are far from having any certain ideas respecting it.

Some have attributed it to starvation or deficiency of food; but the history of the disease at its commencement, when the sheep fattens, shows the fallacy of this idea. The rot appears on rich grounds; and besides, though short food may produce many diseases, and ruin the health of a sheep, it never produces rot.

Some suppose that it may arise from sudden repletion upon rich succulent food. From this may result apoplexy, and similar affections indicative of plethora, but not the rot.

Some think that defective ventilation may cause it, as in cases of folding, &c. This idea is almost absurd. What deficiency of ventilation can there be in the folds of the Downs?

May it not arise from a species of malaria, capable, perhaps, only of affecting the sheep? We know how certain localities produce ague in the human subject, and we know that in the most deadly spots, as the Pontine and other marshes of Italy, some, nay many, animals enjoy their existence; in the morasses of the most pestilential spots, from which man retreats with horror, the buffalo wallows at ease, and breathes the infected air with perfect impunity. In hot climates, pestilential malaria, arising after the rains have subsided, and when the burning rays of the sun draw into the atmosphere the humidity of the ground, produce their baleful effects.

It is principally, if not always, in wet, boggy, or marshy districts that the flocks become diseased with rot. On lands from which the water drains rapidly, and on sandy soils, the disease is little known. They may graze with impunity along the brink of a flowing river, or on the borders of a lake or sheet of water; but let that sheet of water become drained, yet not dried thoroughly up—let the decomposition of vegetable matter go on in the slime or ooze, and then let the sheep feed on its borders, not one will escape. Let a meadow with a tenacious subsoil be flooded, and the water drained off, and let sheep be turned upon it while the ground is so soft that it takes

the impress of their footsteps, and rot will mark each animal. It is not from the water that they suffer; it is from the evaporation of it, and the exhalation of miasmata from vegetable matters in a state of humid decomposition. Hence it is that on dry declivities rot never appears, while it is perilous to turn sheep, even for a few minutes, into a neighbouring spot where water always lodges, and where vegetable decomposition is ever going on. But let this spot be flooded by a deluge which converts the upper lands into mire, then this flooded land, as long as it remains so, though it may drown the sheep, it will not rot them; while on the upper miry land they will be all affected. The action of the sun and air on the putrescent matters is requisite for the communication of the disease. It is so in the case of ague. Damp, oozy, semi-drained spots are the places in which this disease is rife. Witness the marshes of Essex and the fens of Lincolnshire, as they formerly were at least. Harrison, in his *Inquiry into the Rot in Sheep*, refers to a farm in this latter county, consisting of high and low lands of a loamy and tenacious nature. As long as a brook which runs through the farm remains overflowed, and the water continues on the adjoining flat grounds, the sheep never suffer any inconvenience, though they are frequently obliged to wade for their provisions; but as soon as the flood has subsided, while the land retains its moisture, and the weather is hot and sultry, they can be tainted in an hour. The butchers were well acquainted with this fact, and the importance of it; for, when they purchased any fat sheep from him, they stipulated that they should be turned on Mr. Harrison's meadow before they were sent away, in order that they might be tainted with rot, and thus improve more rapidly.

During seasons of frost, when the ground is hardened, sheep may be turned with impunity upon spots notorious at other times for the production of this disease. The reason is obvious: no evaporation takes place, the ground is locked up; but let a warm thaw take place—let the sun and air draw up the miasmata of the dead and decaying herbage, and every sheep will be infected.

The drainage of land is very important, but with respect to sheep even drained land may be peculiarly fatal; it is drained, perhaps, sufficiently for agricultural purposes, but not for sheep; it retains water after rain, and is covered with little puddles from which pestilential evaporation is ever going on, and the farmer suffers great loss. Nothing is more important than the thorough and complete drainage of a sheep farm; half-measures are not only useless, but constitute one mode of throwing money away.

How far, it may be asked, will the miasmata of swamps and marshy oozy lands extend? We

cannot well determine; we doubt not however that low currents of air may sweep, loaded with infection, over a flock at some distance from their place of origin. This is a point however on which we have no definite data.

With respect to any benefit arising from the employment of medicine in rot, when it is fairly established, we are not very sanguine, but in the earlier stages of the disease, before the disorganization of the liver has proceeded too far, some good may be done.

In the first place, the loss of a few ounces of blood is advisable, to which a few doses of Epsom salts may succeed, after proper intervals of two or three days. Immediate change of diet is imperative; hay, straw, or chaff should be substituted for green food, and salt liberally given; salt should be ever within their reach, and if salt-marshes are accessible let the flock be transported there immediately. But salt the sheep must have. It may be mingled with the hay, it may be given morning and night in doses of two or three drachms, and when the inflammation has subsided, it may be mixed with powdered gentian and ginger. Salt "is a purgative inferior to few when given in a full dose, and it is a tonic as well as a purgative. Its first power is exerted on the digestive organs, on the stomach and intestines, augmenting the secretions and quickening the energies of each. It is the stimulus which nature herself points out, for, in moderate quantities, and mingled with the food, men and beasts are fond of it." But furthermore, supposing the yellow tinge of the skin and eyes still continues, can nothing more be done? Certainly: mercury must be resorted to, but with due caution. Some advise friction with mercurial ointment over the region of the liver, but there is danger of inducing sudden salivation, under which the constitution will give way. It will be far better to administer a small dose of calomel daily, say two or three grains, with a grain or a grain and a half of opium, than to have recourse to mercurial ointment. The union of the opium with the calomel neutralises its irritating effects, and secures its action upon the liver, &c. Should the sheep recover under the treatment, the farmer's care will be to place them out of danger of a second attack. He must locate them on the driest and healthiest part of his farm, allow them a portion at least of dry provender, and place an unlimited supply of salt (rock salt) within their reach.

And here we would add, that if necessity constrain the farmer to turn his sheep into suspicious pastures, it will be well to supply them with this preservative; indeed, at all times it is beneficial; it is essential to the health of all cattle (see 'Ox,' p. 92), and its free use might go far to check the ravages of the rot.

As to whether the farmer should sell off his

sheep while in high condition as to fat when the first signs of rot appear, must depend upon many circumstances—the state of the market, his facilities for getting rid of them at a fair price, the nature of his farm, &c. In some instances this may be his best plan, but in other cases he must combat the disease, and try his utmost in attempting to arrest its progress.

INFLAMMATION OF THE SPLEEN.

The spleen, or melt as it is commonly termed, is an elongated spongy viscus, lying on the left side of the abdomen, and closely tied by mesenteric membrane to the rumen throughout its whole extent. All are familiar with its appearance, but of its precise functions we have at present no very positive knowledge, although many have been the theories respecting it, and many the experiments to test those theories.

In the human subject the spleen is the chief organ which in cases of inveterate ague becomes enlarged, indurated, and disorganized. Generally speaking, however, as far as our own experience goes, we find it less subject to disease in animals than any other of the abdominal viscera. It would appear however that inflammation of the spleen is of more frequent occurrence in the sheep than has generally been supposed, but from what cause or causes is doubtful. M. Tochenlin, a veterinary surgeon in the Grand Duchy of Baden, was the first who called attention to it. It is stated to prevail most during the hot summer months, when the animals are changing their covering. Almost the first symptoms resemble those of influenza. "The gait becomes uncertain and staggering, the eyes are half closed, red, and weeping, the appetite fails, and rumination ceases, the bowels are constipated, the flanks are swelled, the breathing is laborious, the emaciation rapid and extreme, and the animal often dies in the course of a few days. Sometimes the sheep perishes suddenly without any, or scarcely any, symptom of previous disease.

"After death the paunch is found distended with gas, and with food,—the latter in a state of putrid fermentation, necessarily producing the former; the small intestines are in a gangrenous state; the liver is partially decomposed, and filled with vitiated bile; but most of all, the spleen is gorged with blood, softened, enlarged, not unfrequently ruptured, filled with tubercles and ulcers, with, in short, various appearances of disease, but all of them the consequence of inflammation, principally belonging to this gland, and of the most serious character."

We strongly suspect this mischief in the spleen not to be a primary affection—we are inclined to regard it as the consequence of disease commencing in some other viscus, as the stomach,

slowly progressing, and influencing all the viscera immediately connected with it, till at length the climax comes, and the animal almost suddenly perishes. Then, because the previous indisposition of the animal has been unnoticed, and the spleen is found to be diseased, the cause of all is attributed to this organ, whereas, in truth, it has been drawn into disease by the pre-existing morbid condition of another viscus.

With respect to any plan of treatment we have nothing to say. Could we, from any definite symptoms, ascertain the existence of inflammatory action in this organ, we should have recourse to bleeding and aperients, which in all febrile diseases are the remedies chiefly to be depended upon; and, indeed, granting that no definite symptoms are to be detected, still the fevered condition of the system will demand these modes of reducing inflammatory action. So far then we cannot err; if they were manifest could we do more? we suspect not.

ACUTE INFLAMMATION OF THE LUNGS, OR PNEUMONIA.

Next to the rot inflammation of the lungs is perhaps the most common and most fatal disease to which sheep are liable, it runs a rapid course, and can be arrested only during the first stage, and the most vigorous treatment is necessary.

Various causes produce this malady; sudden cold acting on the body when overheated, the loss of the wool during inclement or changeable weather, hard driving, and the like. It often appears among the flocks in April, when the days are warm and the nights cold or frosty. Lambs overheated with play are at this season very liable to it, and both in sheep and lambs the farmer's loss is often very severe.

Inflammation of the lungs comes on with the usual febrile symptoms, shivering, succeeded by fever, a hard quick pulse, loss of appetite, and arrest of rumination, the flanks heave, and a frequent and painful cough distresses the animal. This cough increases in violence, and the breathing becomes laboured, soon the pulse begins to waver, foetid matter runs from the nose, the animal grinds its teeth, and is tormented with thirst. Now comes the last stage; the cough changes its character and is weaker than before, the flanks heave convulsively, the pulse is almost imperceptible, the discharge from the nostrils increases, often there is a cracking from air beneath the skin on pressure of the loins, the animal staggers, and the expression of the eye and countenance denotes great suffering—happily soon to terminate, for unconsciousness and death are near. On examination after death, the lungs will be found distended and gorged with black putrescent blood, and their substance to be gangrenous, so that a touch breaks it down or lacerates it. The heart mostly exhibits traces of inflammation, and there is

fulness of the maniplus, distention of the abomassum, and often enlargement and softening of the liver.

From the peculiar condition of the lungs, the shepherds not unaptly call this disease rot of the lights.

It is only at the commencement of this disease that treatment is of any avail. Bleeding is the sheet-anchor of our hopes. Let the wool on the neck be parted (it need not be clipped), the jugular vein opened, and a pint of blood be extracted. All other modes of bleeding are here useless; what is done must be done effectually. After this smart purgatives must be given and their action kept up. Should the sheep faint from the loss of blood, the farmer need not be alarmed—the sheep that faints is more sure of recovery than another; the fainting shows that the arterial super-activity is arrested.

After the action of the purgative medicines, it may be advisable to give sedatives, of which the following may be adopted:—

Nitrate, 1 drachm.
Digitalis powder, 5 or 8 grains.
Tartar emetic, 5 grains.

Mix in a little water or thin gruel—to be given twice a-day.

The animals should be kept in a place sheltered alike from heat and from piercing winds; their diet should consist of mashes and a little grass. When convalescent, tonics, as gentian and ginger, may be administered, provided they do not rally well from their debility.

Acute pneumonia sometimes appears as an epidemic, and makes great havoc. Mr. White relates an instance of this kind. Out of a flock of 300 sheep belonging to Mr. Baker of Wookey, between 50 and 60 died before the advice of Mr. White was requested. They had been bled, but only by cutting the ears, the nostrils, &c., and then left to chance. Mr. White ordered free bleeding from the jugular and purgatives, and lost only three sheep, which were very ill when he saw them first. He also bled every sheep in the flock, whether affected with the disorder or not.

“There were,” he says, “but few that were not affected in some degree, and they were dying very fast. It was adopted therefore as a useful precaution, and so it proved; for every sheep, except the three which were before in a dying state, perfectly recovered. Bleeding therefore was in this instance a preventive as well as remedy; other flocks in the same neighbourhood were successfully treated in the same manner.”

HOOZE, OR BRONCHITIS.

This disease consists in an inflammation of the lining membrane of the bronchial tubes, and is characterized by a peculiar wheezing cough. It is

apt to attack lambs when exposed too early to damp and cold. Besides the wheezing cough, there is difficulty in breathing, the flanks heave, and the appetite fails. If attended to in time a few doses of Epsom salts with ginger, and removal to shelter, will generally effect a cure.

In young cattle (‘Ox,’ 123) inflammation of the lining membrane of the larynx and bronchial tubes is accompanied by thousands of parasitic worms (*Filaria*), which block up the passages, and often produce suffocation. This is not often the case in the sheep, yet it does occur, and may be suspected when the wheezing cough is particularly distressed, when it does not yield to medicine, and when the young animals have been feeding in low woody pastures. The first thing to be done is to remove them from the old pasturage to one which is well drained and healthy; afterwards remedies may be tried. Mr. Mayer of Newcastle-under-Line recommends the administration of common salt, in doses of an ounce and a half or two ounces daily, with six or eight ounces of lime-water given at another period of the day. Mr. Youatt states that he has found this plan of treatment very successful both in sheep and young cattle.

LARYNGITIS.

Laryngitis consists in inflammation of the lining membrane of the windpipe, and is distinguished from bronchitis by a peculiarly ringing cough. It results from cold and from changeable weather, and is sometimes epidemic. In this disease the sheep often stretches out its head as if to breathe more freely, opening its mouth at the same time; it labours evidently under a fear of suffocation, or at least under feelings of suffocation; and, indeed, from the morbid thickening of the membrane, and the closure of the entrance into the windpipe (*Rima Glottidis*), this often happens. In urgent cases bleeding should not be omitted, and active purgatives should be administered; the animal should be placed under shelter, and be fed upon mashes and gruel.

CATARRH, AND EPIDEMIC CATARRH OR INFLUENZA.

Catarrh, or Hooze (a name given to affections of the respiratory passages generally), consists in inflammation of the lining membrane of the great nasal cavities, and thence spreading to the fauces, the glands of the throat, the larynx and windpipe. The eyes are bloodshot, there is a discharge from the nose, accompanied by frequent sneezing, and a cough supervenes, indicative of the morbid state of the windpipe, perhaps even of the lungs. Catarrh, however, varies in degree; sometimes it is mild, at other times it is severe, and attended by febrile symptoms; it then requires active treatment, otherwise it is likely to terminate in consumption.

In mild cases, aperients, mashes, and a dry sheltered place will probably succeed, but when there is a decided cough, then the loss of blood is necessary, in order that the progress of inflammation may be at once arrested. Catarrh should never be neglected, however apparently slight, as it is apt to pursue its course insidiously till the lungs become radically diseased.

Sheep are particularly liable to catarrh at the fall of the year after wet weather; they should be well sheltered, and have a dry place selected for their rest at night; but to these points sufficient attention is seldom paid.

With regard to epidemic catarrh or influenza, it occasionally appears as the scourge of a flock, and resembles the disease termed influenza in the horse. "We at once recognise in its symptoms," says Professor Spooner, "the low fever, and the affection of the head and of the mucous membranes, which characterize this disease in the horse."

Mr. Darby, in a communication to the Veterinary Medical Association in December, 1839, gives the following account of his experience:—"On the 8th ult. I was called to attend a flock of sheep, consisting of 250 lamb-hogs. I was informed they had lost and were losing four or five sheep daily. The shepherd brought three dead ones from the fold that morning, and on closely examining the flock, I found the greater part to be more or less affected with influenza. The eyes were closed or partly so, the head very much affected, a purulent discharge issued from the nostrils, and some hours previous to death, a thick ropy discharge took place from the mouth, the stench from which was abominable; a glaring eye with an inclination to keep forming a circle was the last symptom, and death soon closed the scene.

"On examining those that died that morning the following appearances presented themselves: the membrane of the windpipe of a purple colour, and the tube contained much frothy mucus; the lungs were highly congested, as were the vessels of the brain, and inflammatory patches existed throughout the whole length of the intestinal canal. I commenced my treatment by giving the whole flock four drachms each of Epsom salts combined with vegetable tonics, and calculating the proper quantity of warm water, we brewed the medicine in the gross, giving each sheep a quarter of a pint of the mixture. I afterwards gave to those that required it, small doses of digitalis, opium, tartarized antimony, and vegetable tonics. I am happy in being able to add, that after having given this medicine I never lost a single sheep, and they are at this moment as fine a flock of hogs as any on the walks. I should have said, that, when I first saw them, they were on turnips, and having two ounces each of linseed cake with barley chaff. I had them removed from the turnips to old seeds for some days,

but they are now on their usual keep. Several of them went blind, but on applying solution of sulphate of zinc and tincture of opium they have recovered their sight."

This communication is really valuable; the symptoms are succinctly but clearly described, and the success which attended the treatment is in itself a sufficient proof of the writer's judgment. He did not bleed; the fever assumes a low type, so that even with aperients tonics were necessary, as well as with the sedatives given afterwards.

The following account from the Proceedings of the Veterinary Medical Association, April, 1839, by Mr. Clayworth of Spilsby, Lincolnshire, will serve to exhibit influenza under a somewhat different phase, due perhaps to the influences of climate and locality. The author observes that influenza, so called from its similarity to that disease in the horse, "is most prevalent in the marshes near the sea, where the land is good but much exposed. It prevails mostly in March and April, and generally attacks young sheep. It was on the 19th that I was first desired to attend them. On my arrival I found seven or eight dead. They were observed to be ill on the day previous to my seeing them. There were eight more that could not stand, and when lifted up they had lost all power of motion. On examining the remainder of the flock I found some scarcely affected at all, while others were gradually going on in the same way as those that had died.

"The first symptoms exhibited were dulness of countenance and a disinclination to join the rest of their companions, or to look out for food. They soon became more dull; a thin mucous discharge made its appearance from the nose and eyes, the tissues being highly injected; the ears drooped; a grating of the teeth was heard; and a staggering gait was evinced in walking. As the disease advanced, all the above-named symptoms became more manifest. The animals were able to walk at a slow pace, but if urged into a quicker one they would fall down on their knees, and then on their sides, throw their heads back, and grate their teeth as if in pain. After lying a few minutes they would get up again, although with difficulty, and their manner of walking in this stage of the disease very much resembled that of a horse labouring under inflamed laminae (of the nasal cavity). When the disease had been allowed to run on to this height the sheep mostly became affected with spontaneous diarrhoea—the faeces appearing to come away involuntarily. Those that did not purge usually voided much mucus coating with the dung. After this they quickly became worse; they would lie perfectly still as far as their limbs were concerned, but they continued to grate their teeth, and a rattling noise was heard in the windpipe, accompanied with a frothy discharge from

the nose and mouth, and an occasional cough. To this death succeeded in a few hours.

"The treatment I pursued with those that could not stand was first to place them under a shed with plenty of dry straw to lie upon. To those affected with diarrhœa astringents were administered, such as catechu, chalk, &c., combining with them an aromatic tonic and spirits of nitric ether; while to others that were constipated in the bowels I gave a gentle laxative, following it up with a vegetable tonic. This course of procedure appeared to be attended with benefit, for out of the number, eight that could not stand recovered, and were able to provide for themselves in two or three days. After the exhibition of medicine to the diseased, the remainder of the flock was removed into as sheltered a situation as could be found, or sheds were erected for them with plenty of dry straw to lie upon. A liberal allowance of oats and hay was allowed, while their general comfort was as much attended to as possible.

"To many that gave indications of the approach of an attack of the malady, a laxative and tonic were combined and given.

"On the 21st the sheep were not only looking better but had very materially improved. The above-mentioned treatment was continued, with occasional variations according to the circumstances of each case, and in five or six days they were all out of danger. I am happy to be enabled to say that after this there were not more than two or three sheep out of the flock in which the prostration of strength became so great as to render them unable to stand; and I would add that I never knew one case recover without the aid of medicine, after the disease had lasted so long as to produce the loss of power."

We could not have selected any cases in which the necessity of having recourse to a regular veterinary surgeon is more fully exemplified; and we would here urge upon farmers not to hazard extensive loss by needless delay in calling in his aid. In entering into the details of diseases our object is to guide the farmer, to show him where there is danger, to put him upon his guard, to open his eyes to rational modes of treatment, to induce him to despise ignorant quackery and all its nostrums, but not to neglect the advice and assistance of the veterinary surgeon, whose *rationale* of treatment we would have him understand and appreciate.

CONSUMPTION, OR PHTHISIS.

What we have said respecting consumption in the case of the ox ('History of Ox,' p. 125), applies with equal force to the sheep. It is the result of neglected catarrh, or of subacute or chronic inflammation, running perhaps an insidious course, and ending in the production or in the development of

tubercles previously latent, which increase in size, unite into larger masses, suppurate, and form spreading abscesses, by which the lungs are, as it were, gradually wasted away.

The progress of the disease is at first gradual, the sheep coughs, but it does not fall off in flesh although it does not improve, at least not so rapidly as others; and in this, perhaps, tolerable condition it is sold to the butcher.

Sheep, according to the present system, are sent early into the market—from a year and a half to two years old, and, consequently, before the disease has so far advanced as to wear down the vital powers; nevertheless an attentive observer, if he notice the condition of the lungs of the slaughtered sheep in the market or shop, will find in the majority of instances traces of pulmonary mischief; in some there is a curiously mottled surface, indicative of chronic inflammation, in others tubercles of various degrees of development, and not unfrequently in a state of suppuration. We seldom cut into the lungs of a sheep without discovering abundant evidence of disease more or less advanced, yet the lungs have performed their office. The feeding sheep leads a tranquil life, it is seldom hurried, it is undisturbed in mind, it feeds regularly, and though it coughs occasionally, still it is by degrees brought into a marketable condition. The time has not come for the stage of wasting and atrophy before it is slaughtered; but it would have come sooner or later had the animal been suffered to live. It is killed while its flesh is unwasted, wholesome, and fit for use; the general health has not yet been interfered with.

But let us put the case into another form. Let us take a store-sheep, a breeding ewe, or ram, not destined for the butcher. The ewe coughs, but she feeds well and breeds, and this state of things long continues; gradually, however, it is perceived that her cough increases, and she becomes thinner and perhaps yeans her lamb; now the cough still more increases; she begins to fall away seriously; the lips and inside of the nostrils, and the conjunctiva of the eye and the caruncle become pallid and bloodless. Diarrhœa occasionally makes its appearance and then ceases, and again returns, again perhaps to cease. Rapid is now the course of the once insidiously slow disease. Breathing is laborious and hurried—motion is distressing—food is undigested—emaciation makes the frame gaunt. Again diarrhœa returns—nothing checks it; and the poor animal dies a miserable object.

What can be done under these circumstances? Nothing. It is true that in incipient phthisis, iodide of potassium, in doses of three grains morning and night, the dose being gradually increased to twelve grains, has been recommended; but it will

not pay the farmer to keep a sheep merely for the purpose of trying the effects of iodine, persevered in for months, setting aside the trouble. No; the best thing he can do is to prepare a *coughing* sheep as soon as possible for the butcher. Neither from ram nor ewe ought he to dream of breeding, for the offspring will bear in their system a predisposition to the disease of their parents. Let him, we say, get rid of his suspected sheep while yet in good condition, before wasting has commenced—or at least when he sees that they cease to thrive.

We have ourselves frequently noticed a fact recorded by Mr. Youatt, that sheep from warm climates, as from Africa, brought into our island, waste away, and die in consumption. It is thus that we have seen sheep perish in the gardens of the Zoological Society. Accustomed to the atmosphere of Tunis, or some other part of Africa, they sink under our changeful skies, to the influence of which their bodies, unclothed with dense wool, are so much the more exposed. After death, the lungs are found dreadfully tuberculated.

BLAIN, OR GLOSS-ANTHRAX.—INFLAMMATION OF THE TONGUE AND THE PARTS ADJACENT.

We have already described this disease in the ox ('The Ox,' p. 137). It is a disease to which sheep are not very liable, although it occasionally appears, and sometimes even as an epidemic. It appears, moreover, to be infectious. The causes of this disease are obscure. Probably it arises from some unknown atmospheric influence acting on a constitution predisposed to it from debility, occasioned by exposure to wet and cold, or by improper or insufficient food.

At the commencement of the disease the animal exhibits the usual febrile symptoms. In a little time, however, a quantity of saliva begins to drop from the mouth. This discharge is at first limpid and devoid of smell; but as the disease makes progress it becomes bloody, purulent, and extremely fetid. The inflammation now rapidly extends itself; the head and neck swell, often to an alarming degree; the animal breathes with difficulty, for the pharynx partakes of the inflammation, and almost closes—indeed, sometimes suffocation absolutely takes place. If the mouth be examined, a succession of vesicles will be found to have risen along the side of the tongue, and also underneath it. Their colour varies from red to a livid hue; they have grown rapidly; many have burst, and produced deep sloughing ulcers; while abscesses form around, which break outwardly.

It would appear that this (or a variety) is the disease described by Mr. Hogg, under the name of *Great-head*, as not uncommon among sheep in Scotland, but rare south of the Tweed. He states that on some of the Kells hills in Galloway, in

certain parts of the Grampians, and in Skye, such sheep as frequent the bare and bleak tops of the hills, if the precaution of driving them every night to the lower parts be not taken, are subject to a disease called the *great-head*. The head rapidly enlarges, and at length an abscess is formed; after this, unless indeed the animal be worn down by the profuseness of the discharge, it quickly recovers. Sometimes there are more abscesses than one, and occasionally gangrene ensues.

The cause of this disease, according to the superstition of the natives of the mountains of Cairn Gorm and Lochavin, is at least in accordance with wild poetic imagination, if not with philosophy. "They say that a most deformed little monster (query, Sir Walter Scott's Black Dwarf) inhabits the tops of these mountains, whom they call *Phaam*; that he is very seldom seen, but whenever he is seen it is very early in the morning immediately after the break of day. His head is larger than his whole body; his intents are evil and dangerous; and he is no earthly creature. If any man or animal comes near to the place where he has been before the sun shines upon it, the head of that man or animal will immediately swell enormously, and death will often follow after very great pain has been endured. The baneful influence of this elf or goblin is often very severely felt among the mountain flocks."—*Hogg's Shepherd's Guide*.

In the early stage of blain, during the fever, bleeding may be of advantage; but blood must be taken with caution, for the stage of collapse is to be feared; indeed, the time for bleeding has generally passed by before anything particular has elicited attention. The next step is to secure the animal, and (remembering that the disease is contagious) to open its mouth and freely lance every vesicle, so as to give vent to the glairy fluid they contain. The mouth and tongue should then be thoroughly washed with warm water, and afterwards deluged with a solution of the chloride of lime (a drachm to a pint of water). Should there be abscesses about the neck or jaws, they must be opened by the lancet, and their contents evacuated. In the meantime, the strength of the animal must be kept up with oatmeal gruel, in which powdered gentian may be mixed, chopped carrots and turnips, bruised oats, and whatever is nutritious. If requisite, a tonic aperient should be administered.

For further information respecting this singular disease, which may be communicated to the human being, and to domestic animals generally, we refer our readers to 'The Ox,' p. 137, *et seq.* Too much care on the part of the shepherd or medical attendant cannot be taken.

THRUSH, OR APTHÆ OF THE MOUTH.

In some respects this disease resembles blain,

but there is not that enormous swelling of the head, neck, and throat, which is characteristic of the latter; nevertheless, it belongs to the same order of maladies, and may be a mere variety. It commences with inflammation of the mouth, which runs on to the production of small vesicles. The causes of this affection are obscure; but it is sometimes epidemic and very fatal. The first symptoms, as is usual, are febrile; but the degree and duration of the fever, or the inflammatory stage, vary. The sheep is dull; it pines; it wanders about, ceasing to feed, and ceasing to ruminate; viscid saliva drips from its mouth, and this perhaps excites attention. The animal is secured and its mouth examined; several small vesicles are found within in different parts, and sometimes even about the nostrils and lips. This affection is readily cured; the mouth should be well cleansed, and then laved with a weak solution of alum, or tincture of myrrh and water. A purgative should be given.

Mr. Youatt has remarked that there is often a curious coincidence between thrush in the mouth and foot-rot when the latter has run to ulceration; but whether in consequence of licking the foot or rubbing it with the muzzle the mouth has become inoculated, or whether there is a connexion between the two diseases, is not very clear. At all events, when the farmer sees a sheep afflicted with foot-rot, discharging viscid saliva from the mouth, and neglecting its food, he may be certain that the animal has thrush, and must act accordingly.

Although thrush in sheep is generally cured with little trouble, it sometimes assumes a more serious form; and on the continent has several times appeared as an epidemic, and proved exceedingly fatal. M. Gellé relates a formidable case relative to the ox; and M. Paulet (*Recherches sur les Maladies Epizootiques*, vol. i.) describes the progress of this disease, which broke out in France in the year 1745, among the flocks of sheep. Its career was arrested, as it is said, by the administration of the following medicine—viz., two ounces of crude antimony, two ounces of nitre, four ounces of sulphur, four ounces of bayberries, and ten pounds of salt, all mixed together. This was put into the troughs for the animals to lick at their pleasure. Probably the salt was the really beneficial part of this composition.

In 1764 this disease produced terrible havoc among the sheep in Moravia; and it was observed that in favourable cases, when the thrush about the seventh day began to subside and the scabs to peel off, tumours of a larger or smaller size appeared at the posterior part of one or of both fore-feet. If the tumours of the foot commenced before the disappearance of the thrush, the progress of this latter disease was immediately arrested; but the lameness increased to such

a degree, that many of the sheep lost their hoofs.

Scabby eruptions about the muzzle, eyes, and ears of sheep, are not uncommon. This complaint is often called *black-muzzle*, and is mostly to be observed in lambs. It is not infectious, and is easily cured by a little purgative medicine, and the application of sulphur ointment, mixed with a twelfth part by weight of mercurial ointment.

STRANGLES, OR STRANGULLION.

Strangles is the common term given to inflammation and suppuration of the salivary glands. It is of rare occurrence in sheep. At first a swelling appears under the lower jaw, it increases, and is painful; the animal is feverish, it loses its appetite, and coughs, and becomes rapidly extremely weak and depressed. In a shorter or longer time the tumour gives evidence of suppuration; if its progress is sluggish, fomentations, poultices, or even a blister may be resorted to, in order to hasten it. As soon as the tumour points, it must be freely opened with a lancet, and the purulent matter allowed to escape, otherwise it will burrow, and cause foul ulcers in various parts of the throat. The abscess may be washed with a solution of chloride of lime, and gradually healed by dressings of tincture of aloes. If the fever is *very* high at the commencement of this disease a little blood may be taken away, and an aperient given; but the debility which ensues on the suppuration of the tumour, and continues often for a considerable time, must be kept in view. Tonics of gentian and ginger, gruel, and other nutritive preparations of food, may be required in order to restore the animal to its wonted strength.

Sometimes, before the tumour has advanced far in its progress, it may be checked and dispersed by the exhibition of a smart aperient, and the use of the hartshorn liniment, in which the *liquor ammoniæ* should predominate over the oil. Mr. Youatt narrates a case in point, which the farmer may bear in mind, when he observes one of his cattle exhibiting signs of this disease.

"A short time since," he says, "the most beautiful of the giraffes in the menagerie of the Zoological Society of London was suddenly seized with strangullion, or inflammation of the salivary gland. He was perfectly well on the preceding evening; but, when he was seen in the morning, there was an enlargement within the angle of the left jaw, and occupying almost the whole space between the jaws—it was hard, hot, and tender; and lower down, towards the point of the jaws, was a second tumour, smaller, but evidently containing a fluid. The medical attendant was alarmed, for he recognised at once the strangullion of the ruminant, and he well knew all its frequent and fatal consequences. Twelve hundred guineas had

been refused for that animal a very little while before. He caused the part to be well and frequently embrocated with the liniment (two parts of hartshorn, or liq. ammon., and one of sweet oil); he cheated the animal with a good dose of calomel in a small onion, he took away all his corn, and put him upon a carrot diet, and in a few days all was well."

HOOVE, OR DISTENTION OF THE STOMACH WITH GAS;
DISTENTION OF THE RUMEN WITH FOOD,
AND OBSTRUCTION OF THE GULLET.

The observations which we have made in our account of the ox (p. 143, *et seq.*), respecting the structure of the stomach of ruminants, are in every respect applicable to the sheep, and need not be here repeated. In one respect the sheep differs somewhat from the ox, namely, in the comparative shortness of the gullet, for the neck in the sheep is, comparatively, rather shorter than in the ox, and of course, from the difference of general bulk and stature, actually so, insomuch that the shepherd may give a drench even by means of a common teapot. For the reasons which we have explained ('Ox,' p. 144), all fluid medicines should be poured down the gullet as gently as possible; there should be no hurry, no throwing in of the fluid hastily, it should be allowed to trickle down gradually, otherwise it will pass into the rumen, instead of the fourth compartment, or abomasum, and there lie inert.

With respect to the casualties, hoove, &c., above enumerated (diseases we cannot call them), we have nothing to add to what we have already said. Read's stomach and enema pump, of a size adapted for the sheep, and probangs, ought to be in the possession of every sheep farmer, and also an œsophagus tube, with its perforated bulb and stylet. The rude and often fatal mode of relieving the rumen of gas, by means of plunging a knife into it, at the left flank, where it is prominent, should never be allowed; if a puncture must be made, it should be done with a small trochar having a silver canula, the canula to be retained in the wound so that no portion of gas or food may find its way into the cavity of the abdomen. Mr. Youatt says that he had once occasion to puncture a sheep seven times in the space of four days. It was sent to the butcher two months afterwards. There was not a vestige of disease in the whole of the abdomen, and it was with difficulty that any trace of the wounds in the rumen could be discovered. He used the trochar.

Some kinds of food, as turnips, green clover, fresh radish, &c., are peculiarly apt to produce hoove, and sheep when turned upon them should be well watched. Nevertheless, we think that on the whole sheep are less liable to become hoven than cattle; and from the general nature of their pasturage

the rumen is not frequently overgorged with food; when the latter does happen, it is in instances where sheep previously kept on short diet are brought without any preparation to a rich pasture, or to feed upon turnips. It occasionally happens that a hard piece of carrot or turnip hastily swallowed becomes impacted in the gullet, producing symptoms of choking, difficulty of respiration, and violent spasmodic actions of the muscles of deglutition. Sometimes this obstruction may be removed even by means of the finger, and almost always forced into the rumen by the gentle use of a probang, made of a tube of leather, with a cane stylet. Even by manipulation alone, a little oil having been poured down the throat, the obstructing substance may be often urged onwards. It is seldom that an incision into the gullet, upon the obstructing substance, is really necessary. (See 'The Ox,' pp. 145-89.)

POISONS.

Sheep feed either voluntarily or with impunity upon more plants than does the horse or the ox. According to the experiments of Linnders, the horse eats 262 species, and refuses 212; the ox eats 276 species, and refuses 218; while the sheep takes readily to 387 species, and refuses only 141; hence sheep are less liable to suffer from unwholesome herbage. Still, however, lambs, especially when separated too early from their mothers, and obliged to browse, often perish from eating deleterious plants. The most common vegetable poison, from the effects of which sheep die, is the foliage of the yew, which is fatal alike to the horse and the cow. Another deleterious plant is the corn-crowfoot (*Ranunculus arvensis*), one of the first flowers that appear in the spring among wheat, or on fallow lands. After seeding in June, the plant withers down and can scarcely be detected. It is extremely acrid, and very poisonous. M. Brugnone made a decoction of the root, and gave three ounces of it to a dog; the animal died in less than four minutes. He put a drop of the expressed juice on his own tongue, and he felt extreme smarting for a long time. He then chewed a small portion of the root, and his tongue, and palate, and back of the mouth were so exceedingly painful for an hour, that general convulsions of the frame followed. These experiments were made in order to ascertain the cause of the mortality among certain flocks of sheep on a farm on the banks of the Doire, and he traced it to this plant. The most efficacious remedy he found to be diluted white-wine vinegar, freely administered; in the sheep thus treated the effects of the poison gradually subsided; on examining the sheep that died he found the stomach and small intestines highly inflamed, and more or less gangrenous.

In cases of poison from the yew, the best plan

is to unload the stomach, by means of Read's pump, as quickly as possible, to wash it thoroughly out with warm water, and afterwards to give active purgatives.

New wheat may be regarded as a poison to sheep, at all events it is exceedingly injurious, and if eaten in any quantity soon produces death.

In the *Veterinarian* for February, 1840, appeared the following important communication from Mr. John Hawes of Taunton:—

"In the month of September in the last year, a flock of sheep, more than 200 in number, strayed into a field where was a quantity of wheat which had not been carried in consequence of the unfavourable state of the weather. They fed rather bountifully on it before they were discovered by the shepherd, when they were immediately removed to the pasture on which they had been previously grazing, and no farther notice was taken of them until the following day, when four of them were found dead, and several others were evidently ill. To all that evinced symptoms of disease Epsom salts and castor oil were immediately given; but, on the following morning, finding that twenty-eight had already died, and nearly as many more were almost dead, the owner sent for me, as is too frequently the case, when it was too late to be of much service. The first thing I did was to examine some of those that had died, and I found the rumen in every instance filled with wheat, barley, and straw, and the abomasum highly inflamed, as well as the bowels; the spleen had the appearance of a mass of coagulated blood—its structure being entirely destroyed; the lungs, in most cases, presented a healthy appearance, as did also the liver. Fifty-eight died in the course of five days after eating the wheat; the others were bled, and half a pint of linseed oil was given to each, and they recovered; but many of them have since thrown their lambs."

This is a very instructive case, and may tend to put farmers on their guard. It must not be supposed that we consider that the wheat in itself was poisonous, yet it became so in a secondary sense, from the manner in which it was taken; it was swallowed ravenously, not properly masticated, mixed with straw, and in an oppressive quantity. What was the consequence? Digestion was at once suspended, the abomasum became the seat of active inflammation, and the spleen so overgorged with blood as to lose its structural integrity. Does not this condition of the spleen seem to prove, at least in some degree, that it is a receptacle for an extraordinary portion of blood, during certain conditions of the circulation? and that it may become thus overgorged? However, this is a subject we have here nothing to do with; and, as we have already said, all theories relative to the functions of the spleen are hypothetical.

SWELLING OF THE JOINTS, OR LEG-EVIL.

This disease consists in inflammation of the ligaments and cartilages of the joints of the limbs, generally of the knees, sometimes of the fetlock, occasionally of the hock. It results from damp and cold, and mostly occurs in lambs a few weeks after birth.

At first the joint swells and becomes hot, stiff, and extremely painful; the swelling and pain increase, and the system sympathises. The poor animal can now no longer stand, it tries to crawl along on its knees, but soon this is impossible—it cannot raise itself—the whole limb is now enlarged—the joint is dropsical, or it ulcerates, and purulent matter is discharged; and now the animal wastes away and dies, or if it survive it will be only a burden to itself from confirmed lameness.

This disease should never be neglected. The moment a lamb appears to move stiffly it should be placed under shelter, the affected joints fomented, and then embrocated with a stimulating liniment—as hartshorn and oil, or soap liniment—the bowels kept in due action, and cordials in warm gruel be administered.

Sir G. S. Mackenzie (*on Sheep*) describes this as a very formidable disease; and observes that the affected limbs are often covered with small blisters or pustules filled with a bluish fluid, and which soon degenerate into sores. He regards the complaint as infectious; but we are not quite prepared to agree with him. The probability is that the causes which produce it in one lamb of the flock produce it in others also.

RHEUMATISM.

Rheumatism, sometimes acute sometimes chronic, frequently afflicts sheep—generally lambs or aged sheep—and is the result of exposure to wet, cold, and piercing winds. Sheep afflicted with this disease move stiffly and as if in pain; they force themselves along, and look thin and miserable. Warmth, shelter, and mild aperients may be of service; and in the case of lambs some good may be done; but in old sheep little permanent amelioration can be expected. The sooner the animal is prepared for the butcher the better. It must be fed under shelter, or probably it will not feed at all.

FOOT-ROT.

Before we speak of pure *foot-rot*, it will be right to distinguish a disease confounded with it under the same appellation. We allude to a disease of the interdigital pit or sacculus, involving the pastern and fetlock joints.

We have already noticed this interdigital pit, which does not exist in the ox nor in many ante-

lopes, although in others it is present. It secretes an unctuous fluid, which oozes from its orifice; a small opening, capable of admitting a probe, just at the bifurcation of the pasterns, anteriorly to the canal, thence runs down underneath the skin and between the toes till it reaches the coronary ligament; here the canal curves suddenly upwards upon itself, and terminates in a blind glandular pouch. The canal throughout its course is lined with fine short hairs. The use of the secretion is conjectural.

Occasionally this canal becomes the seat of disease, which, though called foot-rot, is in reality distinct. It is liable to inflammation, generally from the introduction of sand or gravel, or from fatigue, or travel on hard roads; and consequently the mischief is most prevalent on dry, hard, stony pastures, or in sandy places, and in hot sultry weather. From the course of this canal we may easily understand how its inflammation will produce lameness. This inflammation extends to the whole of the foot, which becomes hot and swollen. Let the foot be neglected, and what is the result? Abscesses and ulceration. The purulent matter will burrow under the coronet, produce quitter, and perhaps loss of the hoof, while ulcers will break out around the fetlock-joint.

It is generally only in one of the fore-legs that this disease appears, causing the sheep to hobble along upon three, but sometimes both the fore-feet are affected, in which case the poor animal is constrained to kneel, and creep about after food in this unnatural attitude; we say after food, but in truth the animal feeds but little, it is in pain, ill, feverish, and pining.

Formerly this disease was attributed to the presence of a worm of some kind (and indeed even now the idea is not extinct), and cruel operations were recommended for the purpose of extricating this imaginary usurper, this *worm o' the foot*. We can only say "there is no such thing."

From the nature of the parts involved in the inflammation and secondary mischief, cure, excepting at the outset of the disease, is not easy. If taken in time some good may be done; the canal must be cleared of any irritating substances, partly by means of a probe, and partly by a fine pointed syringe with warm water. The foot must then be fomented and enveloped in a warm poultice; purgative medicine should at the same time be given, the animal be removed to a sheltered straw-yard, and put upon low diet—if very feverish, a little blood may be taken away. Perhaps a discharge of purulent matter may take place, but this will gradually subside under the poultice frequently renewed; and should any small abscess appear, it should be opened. We are here supposing a very favourable case, in which no actual disorganization of the biflex canal has yet com-

menced; but, alas! experience proves that cases thus manageable are not frequently to be seen. The fact is, that in most instances this disease has assumed an inveterate form when brought under the notice of the farmer or the treatment of the veterinary surgeon. At first the sheep appeared a little lame, but of this circumstance no notice was taken, the lameness was perhaps attributed to some slight accident, and would, it was thought, soon disappear; but it continued and increased, and then it was perceived that something was the matter with the foot. Now a suspicion of the truth begins to be entertained—the foot is examined—it is in a woful condition—and remedies are almost useless. In this, as in other cases, the primary indications of coming disease are not attended to, and thus it is that many sheep are lost which might have been saved had the first incursions of disease been met by proper remedies. It cannot be too strongly urged upon farmers, or keepers of live stock, that no unusual appearance, no symptom, however slight, should be neglected. A farmer should be always suspicious; he should have a lynx-eye in perpetual watchfulness over his stock; he should remember that farm servants, however trustworthy and however accustomed to their business, are seldom very acute or discerning, and that, as a rule, mischief must be very palpable which catches their notice: they may attend well to the ordinary routine of their duties, and yet fail in marking the first signs of some dire malady.

Generally, then, as we have said, it is only when the disease of the canal or duct has advanced to a high degree that it claims notice; and it is then that curative attempts are made. Little can now be done. It is true that the canal may be dissected out, but how horrible the agony! It may be enlarged at the orifice and laid open by means of a bistoury, or a threaded seton-needle may be run along its course and brought out just above the coronet. We would sooner kill the sheep and put up with the loss, than inflict such torture, especially as the animal will be good for nothing afterwards. However, if the canal be dissected out, or laid open, the wound must be dressed with digestive ointment, and afterwards with tincture of myrrh. When this disease is confirmed, and before the sheep begins to wear down, let it be sent to the butcher; its flesh is good, the mischief is merely local.

From this disease, which may be termed *spurious foot-rot*, we proceed to that dreadful scourge

THE TRUE FOOT-ROT.

The sheep is naturally formed for dry hills and mountain districts, on which, by ordinary exercise, its hoofs wear as they grow, and where they are

not softened by mire, or marshy or humid ground. Soft, rich, marshy pastures are alien to its real nature; and when we make the sheep an *artificial* being, we entail upon it many diseases from which it would be otherwise exempt. One evil, of no common degree, which arises from the depasturing of sheep on rich luxuriant meadows, soft lawns, and verdant but swampy or oozy grounds, is the foot-rot.

If we examine the bifid foot of the sheep we shall find the hoof with which the toes are shod to consist of a hard wall or upper portion, and a sole on the under part, which becomes softer as it proceeds backwards, and which in elasticity and functions is analogous to the frog in the foot of the horse. Now the hard rigid crust or wall of the hoof keeps up a sharp edge on the outer margin and apex, and is mainly intended to resist the wear to which the foot of the animal is naturally exposed; and growth and wear ought to be in a parallel ratio. On low moist land the detrition of the hoof is not in proportion to its growth, and the more so as the high feeding tends to induce an acceleration of the horny secretion. Besides this, the hoof is kept in a perpetual state of maceration. What is the consequence? The hoof grows out of its natural proportion, it cracks, the overgrown parts become rent, and sand and dirt enter the fissures and work up to the quick; but what is still worse, the bearing of the hoof is altered; the sole no longer sustains the weight of the fore parts—this ragged overgrown crust has to bear it; the toes become distorted; the subjacent mesh of vessels and nerves are tortured; inflammation commences; ulcers and quitters form; the coronet is swollen; sinuses run in various directions; portions of the hoof become dead and detached—perhaps the whole hoof; and bones, cartilages, and ligaments, become involved in one common mischief. Granulations arise and assume an unhealthy appearance, and the work of destruction goes on. Another cause now aggravates the malady. Flies deposit their ova on the edges of the ulcers or abscesses; the maggots enter into every sinus and burrow in all directions; then indeed the foot becomes awfully diseased; and the poor animal is a miserable crawling emaciated object.

After all, however, this disease is not unmanageable at the outset; it may be treated successfully. All the dead and superfluous horn, all that is detached from the parts beneath must be cut away; the sinuses must be fairly laid open. The granulations must be cut down by means of fine scissors, and then freely touched with caustic. The foot must then be well cleaned, and washed with a solution of chloride of lime, and then bound up in tow. Butyr of antimony (chloride of antimony), from its action in repressing fungous granulations, is very valuable; it should be applied to the denuded parts, especially where granulations

have been cut off, or where others appear to be springing up. We need not say that the foot or feet should be dressed every day, each new exfoliation of hoof carefully removed, the abscesses cleansed, and caustic applied where it is requisite. After each dressing the foot should be embedded in soft tow. In all this there is great trouble and some expense, but under these unfortunate circumstances what is to be done? Little indeed unless the disease be treated early; if not, the farmer will see his sheep crawling about on their knees, and wasting away under dreadful suffering.

Is foot-rot infectious or not? The point is in dispute. Some contend that the discharge from the feet of diseased sheep, applied to the feet of sound sheep, will inoculate them and produce rot; and although we are somewhat sceptical on the subject, it is but right to say that there is at least presumptive evidence in favour of this theory. Mr. Parkinson, Mr. Hogg, Mr. Laidlaw, and others, contend that the foot-rot is highly infectious; indeed, according to Mr. Hogg, so much so, that the driving of an infected flock over part of another farm, has been known to bring it upon the flock of that farm with the utmost virulence. "As a proof," says Mr. Parkinson, "that the foot-rot is contagious, I will relate a circumstance that happened in my flock when I lived at Doncaster. I hired a ram from a ram-breeder, and when he came to me I found that he had the foot-rot in one foot very bad. I had always known it supposed by the shepherds to be infectious, and this circumstance proved the fact. I ventured to put him to the ewes; the result was that they took the infection, nor could I free them from it the whole of the time I kept them, which was thirteen months."—*Parkinson on Live Stock.*

In 1815, M. Gohier, professor at the Veterinary School at Lyons, instituted a series of experiments in order to set the question at rest. He had observed several instances in which the introduction of sheep having foot-rot to a sound flock, was followed by the spread of the disease throughout the whole number; and this induced him to try the effects of inoculation with the purulent or sanious matter.

In October, 1815, he pared the two fore-feet of a sheep to the quick, and applied on the sole some morsels of horn covered with the matter of foot-rot. The part was left undisturbed during eight days. No effect was produced.

On the 18th of December the experiment was repeated on the hind-feet of the same sheep, with this difference, that there was no removal of the horn; but the skin of the bifurcations of the posteriors was well rubbed with the foot of a sheep that had the disease very severely. It was not communicated.

January 11, 1816.—Having pared the soles

of the fore-feet of the same animal, M. Gohier bound on the denuded part a portion of horn from the foot of an infected sheep. On the 17th this horn was removed. A small fungous ulcer of a livid colour was perceived at the top of the external part of the hoof of the left fore-foot. Two days afterwards it appeared as if it were healing, but the animal went lame, as he had done on the 17th. On the 25th the ulcer began to increase, and continued slowly to do so until the 1st of February. The hoof was now a little lengthened, and the animal was constantly lying down. On the 8th the ulcer had reached the internal and anterior parts of the hoof. The horn was removed and the ulcer was healed, but it soon appeared on the neighbouring parts. The foot-rot, for it could no longer be misunderstood, extended between the two hoofs, and the animal became still lamer. The sheep continued in nearly the same state until the 25th of March, when he began to improve, and on the 24th of April no trace of disease remained. A month afterwards he was destroyed. On the 24th of March, however, he inoculated the two hind-feet, and the right fore-foot of this animal in the same way, as in the first two experiments, but with no effect. From these trials it would appear, that foot-rot is not very readily communicated by inoculation, or by the matter of the disease coming in contact with the foot, for out of the above four experiments in one only did the disease supervene. How are we to reconcile this with the communication of it by means of a single sheep to a whole flock.

Mr. Black, the farm overseer to the Duke of Buccleugh, and who is an anti-contagionist, had (says Mr. Youatt) thirteen score of black-faced sheep, the greater number of which were affected with the sheep-rot, and many so severely as to be crawling about on their knees. He turned them into a drier pasture, on which were seven score of Leicester and Cheviot sheep. All the diseased sheep except four recovered, and not one of the Leicesters or Cheviots was infected. Here again we have a fact in strange contradiction to Mr. Parkinson's experience and that of others. Among those who assert the communication of the disease by contact, or inoculation, are Professor Pictet, of Geneva, M. Gasparin, an eminent veterinary surgeon, and M. Faure, veterinary surgeon of Geneva. The latter inoculated thirty-two sound sheep with the matter of foot-rot, and twenty of them became infected. On one sheep the operation was performed six times without success, but produced the disease on the seventh trial.

Whenever there is any doubt, it is best to be on the safe side, and, therefore, no farmer should hazard the health of his flock by introducing among it sheep infected with this disease, which, as most authorities contend, is readily communicable.

Some sheep appear to be more liable to foot-rot than others; the Leicesters—the *indigines*, if we may say so, of flat verdant districts—are far less liable to it than are the black-faced sheep, the Cheviots, and the Southdowns, when removed to moist pastures from their congenial hills.

We shall conclude our observations on this disease with an extract from an admirable paper upon the subject by Mr. R. Read, communicated to the *Veterinarian* for January, 1840. Mr. Read is inclined to disbelieve in the contagious nature of the foot-rot, he deprecates the ruthless use of the knife, and considers that sufficient horn only should be taken away in order to allow the purulent matter a free exit; and he is certainly in the right. With respect to the cause and progress of this disease, he thus writes:—"Low situations conjoined with moisture are the fruitful and primary causes of foot-rot. Sheep in these situations have their hoofs, and the integument above to which they are united, and the highly elastic tissue situated between the claws, constantly in a wet and humid state. Go into any such pastures as that described, and look at their feet. Will there not be an increased growth of hoof? Will not the skin around the coronet and the highly sensitive membrane between the claws be blanched? Will not the vascularity of the parts be awakened from their circulation being enfeebled? Now all this is produced by wet. In a few days, perhaps, we have a change of temperature; evaporation is produced from the surface of the land, and from animal bodies as well, and the ground becomes drier. A reaction takes place; the circulation is quickened, the hoof swells, or rather is pushed from the parts beneath, the skin between the claws inflames, the heels bulge, the coronet enlarges, abscesses form, matter penetrates between the horn and the substance beneath, and disunites the sensitive from the horny laminae; and in the worst forms of this disease the hoof falls off. The joints, tendons, and ligaments are soon implicated. Sometimes from the overshooting of the toe of the hoof it turns back or upwards and breaks the horny sole from the crust. Gravel then gets in, inflammation is set up, a separation of the foot from its horny covering is produced, and from every part of the foot thus denuded, fungus quickly sprouts. The true foot-rot does not, as is generally thought, so often begin from below as from above. Hundreds of sheep on sharp sandy farms wear away their hoofs and soles, and expose the sensible parts, a little heat and tenderness ensue, and matter forms which is soon replaced by fungus. This might be got rid of in a short time; it is only a spurious kind of rot, and is again produced by the injudicious paring of the horny parts by the farmers and shepherds."

With respect to the remedial measures to be

taken in true foot-rot, Mr. Read says, "When a sheep halts, let your attendant cast him. Then, if the hoof is too long, pare it on a level with the sole, shorten the toe, and be particular in examining the foot between the claws. If it is swollen, looks red, or has any discharge of bloody serum oozing from any fissure or fissures, let the solution of bichloride of mercury, or hydrochloric acid, be well applied to the part by means of a little tow twisted on a small flat piece of whalebone. If abscesses have formed around the coronet and burst, they will usually have two or three fistulous openings, which, with your silver probe, you will soon discover. Arm the eye of the probe with a little tow, dipped in the solution, and draw it through the sinus or sinuses. If they extend into the joint, the same thing must be done. Twice is most commonly sufficient to apply the solution in these cases, and oftentimes, when you attempt to pass the probe a second time, you will not be able, from its being filled with coagulated lymph. If any of the discharge is between the crust, pare the sole, and with a feather or syringe apply the solution to the part. Fungus is sure to sprout from any part where the sole or crust is lost, and rapidly will it sprout. Agriculturists are at a loss in curing these morbid growths, as they resist nearly all the caustic applications in use, both empirical and those contained in the *materia medica*. Butyr of antimony, quicksilver, aquafortis, and numerous other applications, are of no avail, especially if the disease is of long standing. There is but one quick and effectual remedy—that is, the hot iron, which will do more good in five minutes than all the caustics in our pharmacy."

The removal of affected sheep to a dry pasture is imperative, and should never be neglected; indeed, in slight cases, or at the commencement of the disease, it may prove a means of cure.

THE SCAB.

The scab is a cutaneous disease, very infectious, and of the same nature as the mange on other animals. It has been known as a pest of the flock from the earliest ages, and is common to every part of Europe. Thus it is noticed by classic writers, and among them by Virgil:—

"Turpis ovem tentat scabies, ubi frigidus imber
 Altius ad vivum persedit, et horrida cano
 Bruma gelu; vel cum torsis illotus adhæsit
 Sudor, et hirsuti secuerunt corpora vepres
 Dulcibus idcirco fluvii pectus ompe magistri
 Perfundunt, undisque aries in gurgite villis
 Mersatur, missusque secundo defluit amni.
 Aut tonsum tristi contingunt corpus amurcâ
 Et spumas miscent argenti, vivaque sulphura,
 Ideasque pices, et puingues unguine ceras,
 Scillamque, elleborosque graves, nigrumque bitumen
 Non tamen ulla magis præsens fortuna laborum est
 Quàm si quis ferro potuit rescindere summum
 Uleris os; alitur vitium vivitque tegendo.
 Dum medicas adhibere manus ad vulnera pastor
 Abnegat, et meliora Deos sedet omnia poscens."

LITERAL TRANSLATION.

The filthy scab infects the sheep when the cold shower
 Has drenched to the quick, and mid-winter is bitter with hoary frost,
 Or when on their shorn bodies the sweat unwashed has adhered,
 Or when prickly briers have torn them.
 On this account the owners immerse all the flock
 In pure rivers, and the ram with dripping fleece is plunged
 Into the pool, and sent to float along the stream;
 Or they besmear the shorn body with harsh lees of oil,
 And mix with it litharge (?), and native sulphur,
 And Idean pitch, and fat unctuous wax,
 And squills, and rank hellebore, and black bitumen.
 But there is not any better remedy for their case
 Than to lance open the head of the pustule.
 The distemper is nourished and lives by being covered,
 While the shepherd refuses to apply his healing hand to the wound,
 And sits still, begging of the gods amelioration.

The scab is most prevalent in the spring, and may be produced by a variety of causes, as starvation, dirt, wet and cold, and the like; but the great source of the mischief is contagion. If a tainted sheep once gets into a flock, unless it be immediately removed, all the rest will become infected. It is not so much communicated by the sheep coming in contact with a tainted individual, as by their resorting to the same rubbing places. It is thus that the skin of the sound sheep receives the infection. Hence it has happened, that when a diseased flock has been removed altogether, and a healthy flock substituted in its place, that the new comers have soon manifested the symptoms of this plague. They have rubbed themselves against the gates, posts, or palings to which their predecessors had resorted, and have caught the infection. When this is pointed out, it becomes needless to urge the necessity of washing such posts, &c., and of re-painting them before sound sheep are allowed access to them.

If the skin of a sheep infected with scab be examined, it will be found to be red and rough, and more or less covered with pustules, which have broken perhaps in various parts and run together, forming patches of crust of greater or less extent covering a sore or ulcerated surface. The animal is restless, it nibbles itself, it tears off its wool, it rubs violently against any object, it scratches itself to pieces with its feet, it becomes fevered, and ceases to feed, and sometimes sinks exhausted by perpetual irritation and suffering.

It is about the twelfth day after a sound sheep has taken the infection that the disease makes its appearance. It comes on with violent itching, the animal is very much disturbed, and scratches and rubs itself with unusual vehemence, the skin is at first rough and covered with small hard pimples or pointed elevations, these run into pustules, filled with purulent matter, and they break in about four days and form scabs; the wool falls off in patches or is torn away, and the fleece is harsh and dry.

The immediate cause of these pustules, and all the attendant evils, is attributable to the

presence of minute burrowing insects or mites (*acari*), and in this respect is analogous to the mange in cattle, and the itch in the human subject; hence it is that when sheep lie huddled together in the fold, or rub on a post or gate where infected sheep have been, the animalcules are received, creep to the bottom of the wool, and commence their burrowing operations. Yet, strange to say, it is for the most part in unhealthy sheep that this disease makes its first appearance; and long-woolled breeds are more liable to it than short-woolled.

The history of these *acari* has been traced out by M. Walz, a German veterinarian; according to him, if a few female *acari* are placed on the wool of a sound sheep, they quickly make their way to the skin, and there bury themselves, an extremely minute red point indicating the spots which they have respectively punctured; on the tenth or twelfth day a little pimple may be detected with the finger, and the skin assumes a greenish blue tint, the pustule now rapidly forms, and breaks about the sixteenth day, and the females again appear with their offspring attached to their feet, or rather the scattered hairs on their limbs. These, in their turn, commence operations, pierce the skin, and bury themselves, live upon its juices, grow, and propagate; and thus colony rises up after colony, till the whole skin, or at least a great portion of it, is populated, to the torture of the miserable victim, who often sinks under the irritation caused by myriads of animalcule enemies. Every litter, according to Walz, comprises from eight to fifteen. The newly hatched *acarus*, kept in a dry place, dies in a few days, and crumbles to dust. The more adult animalcules become dry, and perish more or less slowly according to the dryness or moisture of the atmosphere; but when summer has passed, the adult insect retains its life from the autumnal to the spring equinox, or during the whole winter. This is a curious and important fact, and will account for the sudden appearance of the scab in the spring, when every pains have been taken to eradicate it during the summer and autumn, and when all appearance of disease had been removed. M. Walz tried experiments with male *acari*. He placed some on the skin of a sound sheep. They burrowed as usual, and the scab rose; but the disease did not spread. The animalcules in due time died, the scab healed, and no further ill consequences ensued.

Mr. Youatt makes the following remarks on the production of these and other parasitic animals, which are almost startling:—"The scab," he says, "is often produced by certain exciting causes, as neglect and mismanagement, as well as conveyed by contagion. In this respect it only follows the law by which many other diseases are governed. Worms will multiply in the intestinal canal, when

they have once begun to have existence there; the fluke will fill every biliary vessel, when the existence of rot has established it in the liver; and the *acarus* of scab will continue in its cutaneous or sub-cutaneous dwelling when it has once been placed there; but the question yet remains unanswered, how came they first to have existence? for they have not yet been observed in any other form or state. Physiologists are fast acknowledging the *working of a mysterious but noble principle*—the springing up of life under new forms, when the component principles of previous beings are decaying, or have seemingly perished. Thus, if we macerate any vegetable substance, the fluid will teem with myriads of living beings, called into existence by the process we are conducting; or rather by that power of nature, or that principle which was bestowed by the Author of nature, that life ceasing in one form shall spring up in others, and this while the creation lasts. Thus we have probably the hydatid in the brain of the sheep and the fluke in its liver, parasitical beings which we recognise in no other form, and in no other place. *They were the products of the disease of the part.* In like manner the *acarus* of scab may be called into existence by the derangements which our neglect, or unavoidable accident, or disease, may have made in the skin of the sheep. Scab may be, and is, of spontaneous origin, as well as the product of contagion, and the *acarus* having *sprung into life* within the pores of the skin, obeys the laws of all living beings as to its after existence and multiplication."

This is neither more nor less than the doctrine of spontaneous generation—an organic living being resulting from a fortuitous concurrence of atoms—self-originated according to the working of a mysterious principle, yet endowed with definite organs, for various purposes, evincing design, and the same in each individual of the same species and sex. How is this—how is it that definite species form themselves, or arise in this strange mode—species which are enduring? and why the necessity of propagating their kind, seeing that under certain circumstances they are natural products, and inevitably spring into life? Surely, on such doctrine (for where is the line of demarcation to be drawn), every animal, and man himself, may have thus originally sprung into existence. Why not? We are all only animalcules on the surface of the earth, and may have arisen as the result of the working of this *mysterious principle*. It is with like views, that a clever writer, speaking of the fluke in the liver of sheep, says, "I am inclined to consider that the eggs of flukes may owe their origin to the combined operation of heat and moisture, and may be deposited on the blades of grass or plants in vast numbers, and may then be taken into the stomach

and hatched." Here we have the eggs of a singular parasite produced by the operation of heat and moisture, a fortuitous concurrence of atoms under certain circumstances. Strange that such certain, equal, harmonious effects, replete with proofs of design in organic structure, should thus result; that species unaltered should be thus perpetuated; that the acarus of the sheep, or the fluke of the liver, should never be otherwise than what they are and have been. Where or at what point, according to this theory, are we to stop? But why ask! We acknowledge the difficulty of accounting for the existence of hydatids in the brain, flukes on the liver, acari in the skin, and of the internal parasites which make living bodies their home, but we cannot understand the law of spontaneous generation.

The appearance after death presented by sheep which have died worn out by the irritation of this disease are various, but generally indicate great debility and derangement of the system. In most cases the alimentary organs are diseased, and worms are found in the intestines; occasionally the abdomen is dropsical, the liver schirrous, and the spleen enlarged.

With respect to cure, it is not always very easily accomplished. One plan is to dip the animal into a solution of arsenic, drenching the fleece and skin—half a pound of arsenic will be sufficient for twelve gallons of water; but arsenic is dangerous, and if the sheep be too long in the solution fatal consequences may ensue. Mercurial ointment has been tried, and if used should be diluted with from three to five parts its weight of lard; probably the *unquenum hydrargiri nitratis* of the London Pharmacopœia, diluted with four or five parts its weight of lard, might be very serviceable.

Mr. Hogg recommends an ointment which reminds us of that prescribed by Virgil, viz.:—

Corrosive sublimate, 8 ozs.
White hellebore in powder, 12 ozs.
Wheat or other oil, 6 gallons.
Resin, 2 lbs.
Tallow, 2 lbs.

Mix over the fire, the sublimate having been reduced to a fine powder, and incorporated previously with a portion of oil and the hellebore. It is a very dangerous ointment.

Mr. Youatt recommends diluted mercurial ointment, and directs that the wool be parted in lines along the back and sides, in order to rub it the more effectually into the skin; and that all loose scabs be removed.

Occasionally sheep are horribly tormented with irritation of the skin, and furiously rub themselves, when no alteration on its surface can be discovered; the disease is subcutaneous, but from what cause is not very clear. However, they gradually waste away and die emaciated, with the fluids

putrescent. In these cases the sheep should be shorn and housed, washed well with soap and water, and then every other day with equal parts of lime-water and decoction of tobacco. Mercurial ointment, diluted with seven parts of lard, rubbed into the skin, has been found serviceable. A mild tonic purgative may be given. Of the diluted mercurial ointment only two or three ounces should be used at a time, every second day for three or four times.

THE SHEEP-TICK, AND SHEEP-LOUSE.

Sheep are often tormented with these parasites, which fix on the skin and fill themselves with its fluids.

The sheep-tick (*Acarus reduvius*) is a formidable insect, and is furnished with a sharp proboscis, which it buries, head and all, within the skin. The sheep-louse (*Hippobosca ovina*) is small, active, and of a reddish colour, and often swarms in lambs and young sheep in incredible numbers.

These parasites may be killed by means of tobacco-water, or mercurial ointment diluted with seven parts of lard.

THE FLY.

Certain species of fly, about the middle of May or beginning of June, are very troublesome to sheep; they abound in wooded localities, and lay their eggs on the sheep, generally preferring the head, unless there are sores or scratches elsewhere. If sheep are troubled with diarrhœa, and the dung accumulates about the tail, they will select that part on which to deposit their ova. As soon as the maggots are hatched they begin to burrow under the skin, producing great torture and irritation, and if care be not taken the mischief becomes serious. The application of spirits of tar to the affected part will destroy them, and by its smell prevent the attacks of other flies. The coarsest rankest kind of fish oil, as we are assured by Mr. Hogg, will produce the same effect, and might, early in the spring, be smeared on the sheep as a certain preventive. Some recommend plaisters of pitch and bees-wax to be spread upon the head over the sores, or indeed over the whole of the head, as a precautionary measure; but the train oil rubbed on it would, we think, be better, and more comfortable to the animals. The following powder, sprinkled on the places where the maggots are at work, is often used:—

White lead, 4 parts.
Arsenic, 1 part.
Sulphur, 6 parts.
Cinnabar of antimony, 2 parts.
Mix well together.

GARGET, OR INFLAMMATION OF THE SUBSTANCE OF THE UDDER.

Ewes, during the time of suckling, are very liable to inflammation of the udder, either from

cold or damp, or some constitutional tendency to inflammatory action, directed to this part, the rather that its peculiar functions are now called into full operation, and more blood is transmitted to its vessels.

It is no small part of a shepherd's duty to watch the ewes, especially at the early period of suckling, in order to ascertain whether they exhibit symptoms of pain while the lamb is draining the udder, whether they display reluctance to permit it, or whether they altogether refuse. In either of these cases the udder of the animal must immediately be examined, and means of alleviation resorted to. Sometimes one teat, sometimes both the teats, will be found inflamed, swollen, and tender, and knotty tumours will be felt, either confined to one portion of the udder, or universally distributed over the whole; if these are not to be felt, the udder may be more hot and tumid than is natural, sympathizing with the tenderness of the teats. After the udder is cleared from the wool that surrounds it, it must be well fomented, and that for a considerable space of time; a dose of salts should then be given, and the ewe penned up with her lamb and watched attentively, for the progress of garget in the ewe is very rapid, and not unfrequently terminates fatally. If in the course of the following day the animal persists in refusing her teats to the lamb, it may be predicted that mischief is going on, and a rigid examination should again be made. Warm fomentations must be persevered in; and if the symptoms of inflammation be considerable, blood must be taken away, and the purgative medicine repeated. In the meantime, after fomenting, the following ointment may be rubbed over the udder, or the affected portion of it:—

Camphor, powdered by means of a drop or two of spirit of wine, 2 drachms.

Mercurial ointment, 2 drachms.

Elder ointment, 2 drachms.

Incorporate the ingredients thoroughly.

The milk must be carefully drawn away by the hand while this routine of treatment is pursued; and should the inflammation abate, but the knotty tumours continue without dispersing, the following ointment, rubbed on the udder, will prove of benefit:—

Iodide of potassium, 1 drachm.

Rub this down in two drachms of distilled or soft water till dissolved, and add

Lard, 1½ oz.

Incorporate thoroughly.

Notwithstanding all that is done, it too often happens that the hard knots and tumours enlarge, and by their softening indicate the progress of suppuration. They now contain purulent matter which must be let out by means of the lancet, otherwise a portion of the udder will become destroyed. Fomentations must be again used, and

the ulcers washed with a weak solution of chloride of lime at least twice or three times a-day, until the wound begins to assume a healthy appearance, when it may be dressed with Friar's Balsam. Under favourable circumstances the healing will go on very rapidly, so that in a few days the ewe will willingly receive her lamb again.

A ewe which has once suffered from garget is very liable to a return of the disease from slight causes; hence, unless there be some good reason for the contrary, it will be the best plan, after the weaning time, to prepare her for the butcher.

"There are particular seasons, especially warm and damp ones, and when there is a superfluity of grass, in which garget is peculiarly frequent and fatal. Without warning, the udder swells universally with hardened knobs, which sometimes bring on great inflammation; and if that is not stopped in the course of twenty-four hours, part, if not the whole, of the udder mortifies, the mortification rapidly spreads, and the sheep dies."

In many parts of the continent, and particularly in France, this disease prevails extensively. It is popularly believed to result from the bite of a spider, and is accordingly named *Mal d'Araignée*, or spider-evil; it is very fatal, perhaps from the general neglect of the sheep, and the filthy condition of the folds and sheep-houses belonging to the holders of small farms or plots of ground, on which cows, sheep, and poultry of all descriptions are huddled pell-mell together in the farm-yard, if it deserves so respectable a title, wallowing in mire and dung. M. Gasparin regards the fatality of this disease as attributable in a great measure to the ignorance and carelessness of the shepherds, who supinely allow it to make progress, instead of adopting active and decided measures in its earliest stage.

EPIDEMIC PLAGUE, OR PESTILENCE.

From the times of remote antiquity until the present age, pestilential diseases have devastated our domestic races of animal, and have even extended their direful scourge to man. Homer describes the pestilence at the siege of Troy as beginning on mules and dogs, and then attacking man; and Ovid (*Metamorph.*, lib. vii., fab. 25) gives a most powerful and vivid account of a plague, which, in days he called ancient, depopulated Ægina, or Cænopia, commencing its ravages upon domestic animals. We would willingly extract and translate the passage, but admirable as it is (from line 60 to 139) it is too long. A few lines may be admissible:—

"Strage canum primâ, volucrumque, oviumque, boumque
Inque feris subiti deprensa potentia morbi.
Considerare infelix validos miratur arator
Inter opus tauros, medioque recumbere sulco.
Lanigeris gregibus balatus dantibus ægros,
Sponte suâ lanæque cadunt, et corpora tabent."

"The agency of the rapid disease was first observed in the carnage of dogs, and of birds, and of sheep, and of oxen, and also in wild animals. The ploughman saw with astonishment his sturdy oxen stop in their work, and fall down in the midst of the furrows. From the woolly sheep, uttering piteous bleatings, the fleece fell spontaneously, and their bodies wasted away."

He afterwards describes the rapid putrefaction which followed death, and then details the symptoms:—

"The bowels are first parched up, and flushing is the symptom of the latent inflammation, with difficulty of inspiration. Neither bed-clothes nor any coverings are they able to bear; they press the indurated stomach to the ground, but the body becomes not cooled by the earth—on the contrary, the earth is heated by the body."

After this, supervene raving, wildness, prostration, and sudden death.* It is true that he is here speaking of human beings, but the same symptoms occur in domestic quadrupeds, varied according to the type which the disease assumes, for pestilence exhibits modifications in this respect according to the organs principally affected.

To enter into a detailed account of these direful maladies which sweep away flocks and herds, and spread far and wide, their causes being vague and mysterious, is not our intention. We merely wish to remind the farmer, that what has been may be again. "The earliest record in British History (says Mr. Youatt) of any prevalent fatal disease among sheep is dated 1041, when it is said that the greater part, both of cattle and sheep, were destroyed. Another still more destructive epidemic occurred in 1125. In 1315 an epidemic prevailed that was equally destructive to the human being, and every domesticated animal; and another of similar character followed in 1665. In the years 1834 and 1835 an epidemic prevailed among the sheep in the colony of New South Wales; some of the settlers lost more than half their stock, and the mortality was fearful through a considerable portion of the colony." In the latter instance the symptoms were those of aggravated influenza, and the body rapidly putrified after death. Those that recovered were, on the first attack of the disease, bled almost to fainting, and then purged by ounce doses of Epsom salts, combined with a drachm of nitre in warm gruel. The disease was decidedly infectious; and the loss, on the average, in the colony was 7,000 sheep.

FRACTURES, STRAINS, WOUNDS, AND BRUISES.

From the brittleness of the bones of sheep, fracture of those of the limbs is not of unfrequent occurrence. In many cases, the fracture admits of being set and adjusted by means of splints skilfully applied, and the animal speedily recovers. In other cases, it is perhaps better to kill the animal at once, but not unless a veterinary surgeon

recommends it. And here we would again urge the necessity of calling in his advice and assistance. Unless a broken limb be well set, and properly secured, the poor animal will be lame for life, and it cannot be properly set without a knowledge of anatomy, except perhaps in the simplest cases, where common sense dictates what is to be done.

With respect to strains, wounds, and bruises, the observations which we have already made in 'The Ox' (p. 163) are equally applicable to the sheep, and need not be repeated. We do not know that neurotomy has ever been practised upon sheep with diseased fore-feet, but cases may occur in which it would be advisable, and especially when any torturing operation upon the foot is necessary. We throw this out as a hint; for we think that when the free use of the knife and severe dressings in foot-rot, or in disease of the interdigital sinus, are required, the division of the sentient nerve supplying the parts might be previously performed with advantage. However, this concerns the veterinary surgeon only. It must be remembered that the nerve will unite again, and that simple division, without excision of any portion of it, will be all that is necessary.

GESTATION AND PARTURITION.

The period of gestation in the ewe is five months, or about 152 days. As the time of yearning draws nigh, some farmers put their sheep upon rich pasturage, in order to give them strength so as to enable them to undergo nature's trial the better, and yield afterwards a fuller supply of milk. This is a practice which cannot be too much condemned. In the first place, the sheep should have been from the earliest stages of pregnancy depastured upon good and sufficient food, so as to be at this juncture in fair moderate condition; in the second place, the sudden change of diet is apt to induce inflammatory diseases, and perhaps the attack of garget, especially if the animals have been poorly kept. The digestive organs do not readily and all at once accommodate themselves to a change from low to high diet; and when they are once disturbed in their functional operations it is impossible to foresee what mischief may ensue.

Before the expected time of parturition, the ewes should be removed into a sheltered comfortable spot, as near home as possible, and convenient for the shepherd or lamher, on whom now devolves their care. When quietly settled, they should be neatly *clatted*; that is, the matted wool about the tail, the inside of the thighs, and around the udder, should be shorn off—a plan which adds to the comfort of the sheep, and to their health and cleanliness. Too much wool, however, should not be removed—discretion

* Compare Ovid's description with that given by Daniel Defoe, in his *History of the Plague of London*.

should be exercised ; but an experienced shepherd or lamber will seldom err.

All is now in preparation. The lamber is on the alert, and, if a conscientious man, he will feel his responsibility. We have heard of careless brutal men entrusted with the superintendence of the ewes at this critical period, and we know that from neglect or ignorance the farmer often experiences sad loss ; but it is his own fault. Let him bestir himself, and be vigilant in superintendence ; let him exercise sound discretion in the choice of the lamber, and refuse, under any circumstances, to allow the lamber the skins of the dead lambs as his perquisites. What the farmer chooses to do with them afterwards is another matter.

In the enclosures to which ewes are at this time taken, there should be no ditches, no unguarded places, whether filled with water or not, from which danger to ewe or lamb can arise ; and it will be well to have a folding parted off in some convenient spot, to which the ewes that require more than ordinary care or assistance may be conveyed. In open districts the ewes ought at this period to be folded every night, and the hurdles wadded with straw ; if cots are on the ground, these are better still. The sheep feed by day in the adjoining pastures, and return to their shelter in the evening under the vigilant eye of the lamber.

Now, what ought the lamber to be provided with ? We are told by an authority of no trifling distinction, that the lamber "should have with him his lamb crook ; a bottle of milk, ewe's milk if possible, and carried in his bosom or an inside pocket that it may be kept warm ; some cords to tie the legs of the ewes that he may have occasion to assist or examine ; a little pot of tar, with two or three small marking irons, that he may place a different mark on each pair of twins, in order that he may be enabled afterwards to recognise them ; another little pot of grease or oil to lubricate his hand if he should have occasion to introduce it into the womb of any of the ewes ; a sharp knife with a round, or rather curved, extremity, should it be necessary to remove the lamb piecemeal from the mother ; a piece of stout polished iron rod, of the size of a goose quill, twelve inches in length, and rounded at one end somewhat like a button-hook, in order to remove from the womb a dead or divided fetus ; a sheep's drenching-horn ; a small bottle of cordial, consisting of equal parts of brandy and sweet spirit of nitre ; and a strong infusion of ergot of rye."

And really are all these things, instruments, and exciting medicines to be entrusted to the judgment of a man called a lamber, who is utterly ignorant of anatomy in every sense of the word ? It is a fortunate circumstance that the ewe does not often require the assistance of "ignorant" or

"brutal" lambers ; and when she does, how often is her life not sacrificed ? This department of sheep husbandry will never be placed on a good and safe foundation unless men are properly instructed and educated for it. An impatient shepherd or lamber uses his bistoury and his crochet when a little patience and gentle means might have saved the lamb—certainly the mother. Official interference cannot be too much condemned.

Parturition goes on more rapidly, as a general rule, in warm weather than when the air is cold and dry, especially if the situation be exposed. This circumstance must be borne in mind ; and if in warm weather the throes continue for several hours, exhausting the ewe without bringing the affair to a conclusion, then the lamber must see whether some assistance is not needed. If the sheep quietly submits to him, so much the better ; but if she struggle and resist, not only may the lamb be destroyed, but her own life may be sacrificed. He had better wait awhile, and endeavour to conciliate the suffering animal. The natural presentation is the muzzle of the lamb with a fore-foot on each side of it. Having ascertained that all is right so far, a table-spoonful of his cordial, with double the quantity of infusion of ergot, will excite the uterine action, and bring the labour to a conclusion. If, however, the ewe be greatly exhausted, if her tongue hang out from the mouth, and her appearance denote failure of general strength, mechanical assistance must be immediately resorted to. The fore-legs and head must be drawn forwards—an operation in which the lamber may show great address, or, on the contrary, great clumsiness. Good sense, experience, and manual dexterity, are here requisite. Trying cases occasionally occur in which the head is with difficulty brought through the arch of the pubis ; and sometimes even the head of the lamb is so large as to forbid all hope of saving both mother and offspring. The latter must be sacrificed.

It is not often that false presentations occur in the ewe ; and when they happen, it is generally in consequence of rough usage, falls, the worrying of the sheep-dog, and similar causes. In these cases, the lamber must exercise judgment and discretion. His object will be to render, if possible, the presentation natural. The most difficult cases to manage are where the crown of the head or where the breach presents, and loss in lambing often results therefrom. In all cases where the lamb is dead, its extrication should be effected as speedily as possible. For this purpose it may be necessary to dismember it ; but these are rare occurrences. In cases of malformation, the Cæsarian operation may be admissible. It has been performed upon the sheep, but, as might be expected, rarely with success. It would be more humane to slaughter the poor suffering animal on the spot, than resort

to measures so painful, and so extremely hazardous. It should only be attempted by a professed veterinary surgeon, if attempted at all. M. Gohier, Veterinary Professor at Lyons, gives the history of a case in which death resulted, the vital powers failing after the operation. On the other hand, a successful case is narrated in the *Farmer's Journal* for May 26, 1823. A ewe, the property of Mr. W. Pickering, of Kettering, was in labour. W. Dexter, the shepherd, not being able with proper assistance to bring the lamb forward, opened the ewe, and took out the lamb alive. He afterwards replaced the intestines, sewed up the wound, and carefully dressed her. In a short time, the ewe grazed as before the operation; and six weeks afterwards, both the ewe and her lamb were doing well. The shepherd was evidently a skilful man; but we deem his success owing chiefly to chance. If he had operated on four more sheep, the probability is that this one out of the five would alone have been the survivor. Still, we say, the shepherd was a bold and skilful man.

With regard to the placenta, there is seldom any trouble. Should it be retained for a day or two, a little aperient medicine—as two ounces of salts and a scruple of ginger—may be advisable. Occasionally, after very severe labour, protrusion of the uterus takes place. The ewe is useless for breeding in future. The uterus ought to be returned as soon as possible, and with gentle manipulation, and secured by an iron ring passed through the labia externa. But it is still better not to return the uterus, but to apply a strong ligature around it as high as possible; in a few days it will slough off, the ewe will soon recover her health, and should be then fattened up for the butcher as soon as convenient.

The pregnant ewe is liable to inflammation of the uterus, which generally comes on a few weeks before yeaning time, and appears to be connected with general derangement of the viscera, for it often terminates in dropsy and death; and in cases where the ewe recovers (if it can be called recovery), the lamb is feeble, dropsical, and worthless—indeed it generally dies in a day or two, and is often born dead. We know of no remedy. Sheep fed upon turnips and rich succulent food are more liable to this disease than such as are kept upon close natural pasture, and supplied with dry food as occasion may require.

After lambing, inflammation of the uterus occasionally supervenes, especially when parturition has been very difficult, and mechanical aid has been resorted to. The disease runs a rapid course;—bleeding, aperients, and sedatives, constitute the outline of the treatment. May we not call this puerperal fever? Occasionally the farmer experiences considerable loss from it. See 'The Ox,' p. 169.

THE MANAGEMENT OF LAMBS.

The management of lambs is generally simple; they are left to the care of their dams, who usually prove faithful nurses. Occasionally lambs are abandoned, or lose their mothers, in which case the shepherd will have to supply them with foster mothers; and if no ewes are ready to receive them, they must be brought up by hand.

Lambs dropped in the latter part of April and the beginning of May, when the voice of the cuckoo is heard, are termed from that circumstance *cuckoo-lambs*. These lambs are usually very delicate, being the progeny of young or weakly mothers, and require more than ordinary attention; nor should the ewes themselves be disregarded.

In about a fortnight after birth, or even earlier, the lambs begin to nibble the grass, and care should be taken that this food be not too rank and luxuriant. The sudden transfer of lambs from bare to rich pasturage is a great error in management, and more lambs die from this cause than the farmer suspects. The sudden change of diet either produces inflammatory fever or dysentery, in both cases baffling all remedies. The liver is disturbed in its functions; disordered bile is poured out in vast quantities into the duodenum, and frequently is regurgitated into the abomasum or fourth stomach. From the absorption of bile into the system, the skin assumes a yellowish tint, and the fat after death is also found to be coloured. This disease runs a rapid course, seldom enduring more than three days, and frequently carrying off the lamb in fourteen or fifteen hours. Immediate change of pasturage, the loss of a little blood in the commencement of the attack, and purgatives, afford a chance, and but a chance of cure. From the quantity of bile or gall poured out into the alimentary canal, this disease is in some places termed *Gall-Lamb*.

Few male lambs are kept for the purposes of breeding—one or two are perhaps selected—the rest are destined to become wethers, and at what period the operation should be performed may admit of a question. If the weather be cool, or even cold, and the lamb healthy, the earlier the better; less pain, less depression, less inflammation will follow if the operation be performed when the lambs are three or four days old, than if they were a fortnight or three weeks old; hot or sultry weather is unfavourable.

As to the mode in which the operation ought to be performed, there can be only one opinion. The operator who uses his teeth in order to gnaw through the cord, instead of a rather blunt knife for dividing it (the original incision being effected by a fine sharp scalpel), ought never to be allowed to touch a lamb. What is the consequence of this brutal plan,

which produces fearful torture? Tetanus or locked jaw from the shock which the nervous system has received, and under which it quails. Some men will even tell, from the peculiar shudder, the convulsive muscular movements of the animal, that the operation will be fatal, and yet they go on, in the old, and, to say the least, brutal and disgusting plan, without reflecting that after-bleeding, which they wish of course to prevent, would be secured by the sawing action of a blunt knife, causing the retraction of the artery.

With respect to the French plan, termed *bis-tournage*, we shall say nothing; we never saw it practised in England.

The operation by *external* ligature (a waxed cord, as highly placed and as tightly drawn as possible) has been recommended; we have never seen it tried, and hesitate to advise its adoption. We prefer the use of the scalpel, and if it were possible that the operator could distinguish the artery from any other vessel, or from the nerve, and tie a thread around it, or cause its retraction by twisting it by means of a pair of forceps, the sharpest scalpel would be throughout the best, and little pain would be given. But we do not forget that shepherds and lambers cannot be expected to be otherwise than what they are, straightforward practical men, following on in a beaten track, wise in their own conceit, and contented with their plans—plans in practice among their forefathers, and deemed incapable of improvement.

Docking is another operation which we think should be performed early, although some defer it till the lambs are three or four months old. We do not know what advantage results from this latter plan, but certainly the animals suffer more pain. It may be asked, why should the lambs be deprived of so large a portion of the tail; what end does this mutilation answer? Custom, the compact appearance of the short-tailed sheep, and cleanliness, plead in favour of the practice of docking.

It is the practice of some farmers to spay the rejected ewe lambs, as a means of increasing their growth, and their tendency to lay on fat. The danger of the operation is less than might be anticipated, for, strange to say, inflammation of the peritoneum by no means always follows. Much of course depends upon the skill of the operator and the health of the lamb, which ought to be about six weeks old, and without any symptoms of incipient disease. To give directions respecting the performance of this operation is useless. It must be learned on the dead subject; no description will suffice to render the performance of it sufficiently intelligible for practical purposes, nor shall we attempt it.

The weaning of lambs ought to be a gradual affair, and is so under ordinary circumstances. The lamb, from the age of two or three weeks, has

nibbled the grass of the pasturage, and this in an increasing ratio; the compartments of the stomach undergoing those changes in development and function which are requisite for the management of the vegetable aliment on which the animal is destined shortly to subsist altogether. The time of weaning varies according to pasturage, the breed of the sheep, or the intentions of the farmer. The average time of weaning is at four months old; occasionally, when the ground is good and it is desirable to sell the lambs in store condition, they are kept with their dams till the age of six months.

Weaning is a trying affair, both for the mothers and their lambs; the former should be looked to lest *garget* should supervene, and if they have been accustomed to a rich pasture, a poorer land should be selected for them, at least till the secretion of milk has ceased. The lambs should be sent to a distant spot, where their call may not be heard by the dams, nor *vice versa*; if the two parties hear each other's voices and respond to each other, not only will a state of fretfulness be kept up, but the most desperate efforts will be made, on the side both of the ewes and the lambs, to overcome the obstacles which separate them, and a scene of confusion will prevail. Forgetfulness should be induced as soon as possible. Losing their milk, the lambs should be put upon good sound pasturage, but not over-luxuriant; the farmer must keep the fear of disease before his mental vision—"cavendo tutus" should ever be his motto. Still, he should not starve the lambs, nor suffer them to decline in condition; if he does, he will rarely be able to restore them afterwards, however nutritious his keep may be. He had better err on the opposite side.

Young lambs are liable to various diseases, as *diarrhœa*, *distension of the abomasum with a compacted mass of curd*, *constipation*, and *fever*, or *staggers*.

The causes of *diarrhœa* are various; cold may produce it. Sometimes, perhaps, the milk of the mother does not agree with the young animal, but mostly it arises from the change of diet; the grass or herbage, either when the young animal first begins to crop, or at the weaning time, disturbs the digestive functions. If the *diarrhœa* is not violent, and the lamb is lively, active, and feeds well, nothing need be apprehended; but if the animal becomes dull, and loses appetite and strength, it must be taken in hand immediately. Notwithstanding the *diarrhœa*, it will be prudent to give an aperient in the first place, in order to relieve the bowels of all irritating matter. Afterwards, doses of the 'Sheep's Cordial' may be administered, at the same time the animal should be put under shelter, and fed upon gruel and dry fodder.

In the lamb, as in the calf, the abomasum not unfrequently becomes overloaded with a mass of curd; naturally, the mother's milk received into the abomasum is curdled by the operation of the gastric juice; but then, this curd is re-dissolved for the purpose of nutrition. In certain states of the stomach, when its digestive powers are impaired (and this often occurs from change in the nature of the aliment), the curd becomes indurated; it is not dissolved, it accumulates, and that to a large extent, overburdening the abomasum. The whey separated from the curd passes, indeed, rapidly through the bowels, producing a sort of diarrhoea, but the mass of curd remains unmoved and oppressive, and will soon occasion the animal's death. When a lamb in previous good health, and still nursed by its mother, suddenly becomes dull, loses its appetite, heaves at the flanks, exhibits distension of the abdomen, suffers from the purging of a whey-like fluid, or has the bowels altogether confined, we may be tolerably certain that the stomach is loaded with coagulum; this indeed often amounts to the weight of three or four pounds, and unless it is speedily broken up and dissolved, the lamb will die. The administration of alkalis will at least neutralize the acid of the stomach, and perhaps even partially dissolve the mass of curd; a drench, composed of a scruple of carbonate of ammonia, two drachms of carbonate of soda (sodæ sesqui-carbon.), with half an ounce of Epsom salts and a little ginger, may be given in warm water, at intervals of six hours. Read's stomach pump is here a most valuable auxiliary. "*The solution of potass in lime-water*," the preparation of which is directed in '*The Ox*,' p. 174, will be found useful; a teaspoonful or two teaspoonfuls should be added to warm water, together with half an ounce of salts and a scruple of ginger. Should the means used prove successful, the lamb and her mother should be transferred to barer pasture.

Constipation of the bowels in lambs after weaning often results from improper food, as coarse dry grass, which distends the rumen with crude materials, or obstructs the maniplus. Aperients, as Epsom salts, will be required; perhaps even it may be necessary to unload the rumen by means of the stomach-pump.

Lambs in high condition, feeding upon rich pasturage, are liable to fever, which will not unfrequently terminate in alarming inflammatory symptoms. The loss of a little blood at the commencement of the attack, aperients, and scantier food constitute the plan of treatment.

It often happens, when lambs are over-pushed in their feeding for the market, that numbers, not an hour before in apparently good health, are suddenly taken with the *staggers*. A lamb, almost without any warning, becomes evidently

very ill; the head is protruded, and the animal stands as if stupified; if it attempts to walk, its gait is uncertain and staggering; soon it reels—it is unable to walk—it falls, struggles convulsively, and dies. The lancet, physic, and comparative starvation will afford the only means of cure and of prevention.

One important part in the management of a flock is the sorting of the lambs, and also of the ewes, in order that those which are rejected for the purposes of breeding, or that are past service (in the case of old ewes), may be drafted out for sale. This is a business requiring much judgment, where a *breeding stock* is kept up, lest the breed become degenerated and lose its once admired points of excellence. Unless he draft off for fattening and sale all that exhibit the slightest points of inferiority, and dismiss as breeders ewes too aged or such as do not produce a first-rate progeny, he cannot expect to keep up the celebrity of his stock. In all flocks kept by the breeder numbers of lambs are below par, both male and female; and, while a sufficient number of young ewes is retained, according to the views of the breeder, or the deficiencies in his stock, caused either by deaths, by age, or by barrenness (these being all selected with care), the rest may be with propriety drafted off for fattening. His primary selection of young males will have been made previously, but these must be revised, and the points of every ewe lamb severely scrutinized. The rejected ewes may at this time be spayed, if such is the practice on the breeding farm; but, whether this be done or not, the most advantageous mode of their disposal has to be considered; this, in every instance, will be determined by circumstances of pasturage, locality, and private affairs.

A writer in the *Quarterly Review of Agriculture* (vol. iii.) says:—"It is a safe practice to draft as largely as the good qualities of those that are to be transferred to the ewe stock will warrant. The ewes are drafted immediately after the milk has passed away in the weaning of the lambs. The sooner they are drafted after that the better, as the sooner the draft ewes (with caution) are put upon good pasturage the sooner will they be ready for the butcher. Those ewes that have missed lamb, having been drafted from the ewes in the lambing of April, and having enjoyed a good pasture all the summer, should be mixed again with the draft ewes and sold along with them."

In *flying stocks*, that is stocks in which the ewes and lambs are sold off before the termination of the year, and a fresh stock re-purchased, for the sake of the annual profit on the purchase-money, *breed* is of little consequence; nor, indeed, do our observations refer to such flocks—they cannot: we are speaking of the mode to be pursued by the

skilful breeder, who aims at establishing or maintaining the excellence of his peculiar stock, whether it be one of the varieties of the long-woolled or the short-woolled section, or whether it be a mingled breed of admirable qualities. One thing should never be overlooked, viz.—the adaptation of the sheep for the nature, character, and peculiarities of the soil and its productions. A mistake on this point will inevitably result in failure. Tendency to foot-rot, unthriftiness, unhealthiness, infertility, may occur in a flock of the best bred sheep, of the most admirable qualities; unless pasturage and treatment are quite suitable to their constitution. We almost doubt whether this point in the management of sheep has been sufficiently studied. Certainly it is one of great importance, in whatever aspect it be looked at.

MEDICINES EMPLOYED IN THE TREATMENT OF SHEEP.

The observations which we have made under this head in 'The Ox' (p. 177) are here also equally applicable. The more simple medicines ought to be in the possession of the farmer for instant use, in cases of emergency; but the administration of the more potent drugs ought to be entrusted to the veterinary surgeon, by whom alone all important operations ought to be performed. Read's enema and stomach-pump adapted to sheep, should be in every breeder's hands, and kept constantly ready for use. In the treatment of many of the diseases of sheep, the advantages of purgative or of sedative injections are too much overlooked. Aperient injections may consist of a handful of common salt, or an ounce or two ounces of Epsom salts, with a wine-glassful of linseed oil, mixed in a pint of water or thin gruel. Sedative injections, in cases of diarrhoea and dysentery, may consist of a pint of gruel or starch, with three or four grains of powdered opium, or fifty drops of laudanum.

APERIENTS.

In administering medicines to the sheep, the fluid should be allowed to trickle slowly and gently down the gullet or oesophagus, as we have already urged in the case of the ox, and for the same reasons—the structure of the stomach being in both animals on the same plan. To give medicine in a hurried manner, so as to force the animal to gulp it, is to defeat the very object intended; it will force the pillars of the oesophagean canal, enter the insensible paunch or rumen, and there continue inert. It may here be as well to observe that the doses of medicines for sheep in general are about one-sixth in quantity of what are usually given to cattle. Young lambs require only a third, or half the quantity of medicine constituting a dose for an adult sheep.

The following medicines are the most valuable aperients:—

COMMON SALT (CHLORIDE OF SODIUM OR MURIATE OF SODA).

Salt is a tonic in moderate doses, and of great benefit in the rot. It should always be accessible to the flock. In doses of one or two ounces, dissolved in four or six ounces of gruel, it forms an excellent aperient.

EPSOM SALTS (SULPHATE OF MAGNESIA).

An excellent purgative, and that which is most commonly employed. Its dose ranges from half an ounce to two or three ounces. The repetition of small doses at intervals of six hours will keep up the action of the first full dose when desirable; or sulphur may be employed for this purpose.

SULPHUR.

Sulphur, besides its value in cutaneous affections, is very useful as an aperient, especially for keeping up the action of the bowels after the operation of salts. Dose, from one to two ounces. Sulphur is the base of every ointment for the cure of mange.

ALOES.

This drug is not only very uncertain in its operation in sheep, but has often proved fatal by inducing direct inflammation. It is invaluable as a horse medicine, but should never be administered to the sheep.

LINSEED OIL.

Linseed oil is occasionally used as a purgative; it is given in doses of two or three ounces.

ALTERATIVES AND SPECIFIC MEDICINES.

These are medicines which exert a peculiar influence on certain organs, altering their diseased action, or stimulating their respective secretions. Some act more especially on the liver, others on the glandular system, and some on the skin; while one exerts a peculiar action on the muscular fibres of the uterus. A knowledge of the effects of these medicines has been gained by experience; but we know nothing of their *modus operandi*.

CALOMEL (SUBMURIATE OR PROTOCHLORIDE OF MERCURY).

Calomel is seldom used in the treatment of the diseases of the sheep. In cases of rot, two or three grains of calomel mixed with a grain and a half of opium, have been found beneficial; this dose may be repeated every day, or every other day, for several times, its effects being watched.—(See Rot).

SULPHATE OF MERCURY OR ÆTHIOPS MINERAL.

As an alterative medicine, useful in cutaneous

disorders, *Æthiops mineral* has long enjoyed great reputation; it is usually combined with nitre and sulphur, in the following proportions, for a daily dose:—

Æthiops mineral, 1 scruple.
Nitre, 2 scruples.
Sulphur, 4 scruples.

IODINE.

Iodine is useful, both as an external application and as a medicine taken internally, in cases of glandular affections and indurated swellings of the udder. Its most convenient form is the iodide of potassium. An excellent ointment is composed of one part of the iodide, and seven of lard.

Iodide of potassium is strongly recommended in consumption, when tubercles have formed on the lungs. The dose is two grains, gradually increased to four or six, given morning and evening, in a little gruel.

ERGOT OF RYE.

In cases of lingering parturition, when the powers of the uterus are exhausted, ergot of rye is very useful; it exerts a peculiar action on that organ, and arouses its dormant energy. It should be employed with caution. The dose is a scruple or half a drachm, repeated at intervals of half an hour if necessary. An infusion of ergot of rye is used by lambers and shepherds, conjoined with a cordial composed of equal parts of brandy and spirits of nitre (*sp. æther, nitrici*).

SEDATIVES AND FEBRIFUGE MEDICINES.

These are medicines calculated to allay fever, and moderate the action of the arterial system. Among these nitre or nitrate of potass, tartar emetic, or tartrate of antimony, and the powder of digitalis, *i.e.* of the dried leaves of the foxglove, are chiefly in requisition. Opium, or tincture of opium (*laudanum*) are in a certain sense sedatives, indeed in some diseases their use in allaying irritation cannot be over-rated. But to this invaluable drug we shall have occasion to revert hereafter.

NITRATE OF POTASS.

Nitre is used as a febrifuge with good effect, but generally in combination with other medicines. Its dose is from half a drachm to a drachm.

TARTRATE OF ANTIMONY.

The effects of this medicine in lowering the action of the heart and arterial system is very decided. Hence in many inflammatory diseases it is of great importance. It is given to the sheep in doses of five or six grains.

DIGITALIS.

The powdered leaves of the foxglove have

been long esteemed for their decided effects upon the action of the heart. They not only reduce the force of the pulse, but often render it intermittent. Digitalis, in combination with nitre and tartar emetic or tartrate of antimony, forms an efficient fever medicine in cases of high inflammation, as pleurisy and similar diseases.

The following formula for sheep has been used with success:—

Digitalis powder, 5 grains.
Tartrate of antimony, 5 grains.
Nitrate of potass, $\frac{1}{2}$ drachm.
Water, 3 or 4 ounces.

Mix. To be given twice a-day.

ANTISPASMODICS.

The great antispasmodic, the great allayer of pain, and of irritation of the alimentary canal, whether in cases of diarrhoea or dysentery, is opium.

OPIUM.

The dose of this all-potent medicine (when judiciously administered) is two or three grains. Combined with oil it has been given in dysentery with the best effects. Mr. D. Sayer found in certain cases of dysentery the following perscription of great service:—

Linseed oil, 2 ozs.
Powdered opium, 2 grains.

Mix in an infusion of linseed.

On the following day, he gave twice in the 24 hours this mixture:—

Powdered opium, 2 grains.
Powdered ginger, } of each $\frac{1}{2}$ drachm.
“ gentian, }

Mix in linseed tea.

Afterwards this draught was repeated once a-day, with the addition of half an ounce of linseed oil. This was continued for four days, when the sheep recovered.

In cordial and astringent medicines, opium is an essential ingredient, and it may also be combined with aperients.

LAUDANUM, OR TINCTURE OF OPIUM.

Tincture of opium possesses the same properties as the powder of opium, but is perhaps quicker in its effects. The dose for sheep is from twenty to sixty drops.

TONICS.

It is often necessary in cases of debility, when acute disease has been subdued, to restore or invigorate the system by tonics. Of these gentian is the best, and indeed will supersede every other.

GENTIAN.

Powdered gentian root may be given as a tonic in doses of from half a drachm to two drachms, in

combination with a scruple or half a drachm of powdered ginger in gruel or water, or in a little ale.

CORDIALS.

Cordials or stimulating drenches are not so often given to sheep as the horned cattle. The best of these cordials are ginger, caraway-seeds, essence of peppermint, and carbonate of ammonia.

GINGER.

The dose of this root in powder is from a scruple to a drachm. It is generally mixed with aperient medicines, and aids their operation.

CARAWAY-SEEDS.

Bruised caraway-seeds are useful as a cordial, though inferior to ginger. Dose half a drachm or a drachm.

OIL OR ESSENCE OF PEPPERMINT.

Peppermint water, that is water in which the oil of peppermint is diffused, is a good vehicle for tonic and astringent medicines. It is never given alone.

CARBONATE (SUBCARBONATE) OF AMMONIA.

In cases of repletion of the stomach by a mass of undigested curd (to which lambs are subject), carbonate of ammonia may prove very useful, both from its stimulating and its antacid properties. A drench composed of a scruple of carbonate of ammonia, two drachms of carbonate (sesqui-carbonate) of soda, half an ounce of Epsom salts, and a scruple of ginger, in warm water, may be given every six hours.

A solution of potash in lime-water is recommended in these cases ('Ox' p. 174). We here give the directions for making and administering this solution.

Take a lump of quick-lime of the size of an egg, and pour on it, in a convenient vessel, as much water as will slake it. This being done, then pour upon it one pint of boiling water; stir the whole up, and cover close. While this is allowed to stand for some time, take an eight ounce bottle and put into it two ounces of sub-carbonate of potass; and fill up the bottle with the lime-water already made; pouring it off rather turbid than in a state of purity. Cork this up and label it—"Solution of potass in lime-water."

Of this "Solution" a teaspoonful or two should be added to some warm water, together with half an ounce of salts and a scruple of ginger, and given every six hours, till good effects result.

We can hardly call this a cordial medicine; its effects, setting aside the Epsom salts, are chemical, and the same observation applies to

chloride of lime given internally in cases of hoove. Its dose in the shop is about half a drachm. For its *modus operandi* see 'Ox,' p. 181. As a disinfectant and cleanser of foul ulcers, a solution of chloride of lime applied externally, and used freely as a wash, is invaluable.

CHLORIDE OF LIME.

For its properties see above. A solution of chloride of lime for washing infected sheep-cotes, ulcers, &c., may be made with half an ounce of powder dissolved in a gallon of water. Taken internally in hoove, it acts chemically as a cordial by secondary effects.

CARBONATE (SESQUI-CARBONATE) OF SODA.

Carbonate of soda is an antacid, and useful as a component in cordial draughts, where the correction of acidity in the stomach is desirable. Dose about a drachm.

ASTRINGENTS.

Astringents are medicines which act upon the mucous membrane of the alimentary canal, and check diarrhoea. They consist of lime, or chalk, opium, catechu, &c., and are always combined with cordials. Of lime, or rather chalk, little need be said; it is given in doses of half a drachm or a drachm. Of opium we have already spoken.

CATECHU.

This is an extract from a tree of the acacia tribe, and is very valuable. Dose a scruple.

The following is a useful astringent cordial for sheep and calves:—

Prepared chalk, 1 oz.
Powdered catechu, $\frac{1}{2}$ oz.
Powdered ginger, 2 drachms.
Powdered opium, $\frac{1}{2}$ drachm.
Mucilage or gum-water, thick, 2 ozs.
Peppermint-water, 6 ozs.

Mix. Dose, two table-spoonfuls twice a-day.

ALUM.

Alum is not often used in the treatment of sheep. Its dose is ten or twenty grains, according to age. The 'Sheep's Cordial' renders it unnecessary.

EXTERNAL APPLICATIONS.

Setons are seldom used in the treatment of the diseases of the sheep; and the wool prevents blisters from taking effect. With respect to chloride of lime, as we have noticed it under the head of cordials, we need not repeat our observations relative to its value as a disinfectant and cleaner of foul sloughing foetid ulcers, when

properly diluted with water (half an ounce to the gallon).

The following external applications require a brief notice :—

POULTICES.

Those of linseed meal are the best ; it is often advantageous to mix with them a little chloride of lime, especially if they be applied to foul ulcerations. In accelerating suppuration, a little turpentine is a useful addition.

STIMULANTS.

Turpentine, camphorated oil, and hartshorn, form a good embrocation, useful in strains and chronic rheumatism. To two ounces of camphorated oil may be added an ounce of turpentine, and half an ounce or even an ounce of hartshorn.

OINTMENTS AND LOTIONS, &c.

Mercurial Ointment, when rubbed down with five or seven parts of lard, forms a safe and almost certain cure for the scab.

White Lead is often sprinkled over the part struck by the fly, in order to destroy the maggots burrowing in the skin. It is superseded by the spirit of tar, or by the coarsest kind of fish oil.

Corrosive Sublimate.—A dangerous remedy, often employed in solution as a wash for scab. Washes, whether of a solution of arsenic, infusion of tobacco, or of hellebore, are equally objectionable. They are superseded by the diluted mercurial ointment.

Spirit of Tar.—A useful application in foot-rot, and very serviceable when freely applied to parts that have been struck by the fly ; it not only kills the maggots, but prevents the attacks of the insects, which are repelled by its odour.

Turpentine.—Useful as a stimulant in ointments and embrocations. It may be mixed with linseed-meal poultices, in order to hasten the suppuration of sluggish tumours, and is a serviceable application to wounds of long standing which require a stimulus.

DRESSINGS.

Among the dressings for wounds, tincture of aloes, tincture of myrrh, and tincture of benzoin, or Friar's Balsam, are chiefly in request. For farther observations on these, we refer to 'The Ox,' p. 183.

Tar mixed with lard is a useful dressing in foot rot.

CAUSTICS.

At the head of caustics stands nitrate of silver, or lunar caustic. It is to the free use of this that the veterinary surgeon will trust in probing the wounds of cattle caused by the bite of a rabid dog.

It is very useful in removing warts and cutaneous excrescences.

Other caustics, however, are in requisition. In cases of foot-rot, hydrochloric acid, or a solution of bichloride of mercury, is recommended by Mr. Read, as an application to the part infected (see foot-rot).

Butyr of antimony, or chloride of antimony, is a very useful and convenient caustic. It has been employed in foot-rot, and acts well where a superficial effect only is required. It does not produce any deep corrosion ; hence in indolent ulcers, in foot-rot, and in the removal of fungous excrescences, it is of important service.

Verdigris, or acetate of copper, mixed with sugar of lead, finely powdered, sprinkled on slug gish ulcers, sometimes acts with good effect.

Blue vitriol, or sulphate of copper, finely powdered, is frequently employed as an escharotic, in order to produce superficial sloughing. A saturated solution is recommended by some veterinarians as an application of great benefit in cases of foot-rot.

FOMENTATIONS.

The great benefit resulting from fomentations results from the warmth of the water. In cases of inflammation of the udder or garget, fomentations are indispensable. Many have an idea that the good effects of fomenting depend on the herbs which, as is generally the case, are boiled in the water ; but this is an error. Poppy-heads or a little laudanum in the water may be advantageous, from the known properties of opium in allaying pain. Slight fomenting is useless—it should be long kept up, but this is seldom done, for it requires no small degree of quiet patience.

PLAISTERS, OR CHARGES.

Plaisters, or charges, are in frequent demand. They are useful in cases of sprain or local debility, or as a covering and protection to sores or wounds, or the basal part of fractured horns. They form a good defence in cases of travel-worn feet, and in various ways are serviceable. They consist of a mixture of pitch, wax, resin, lard, &c., in different proportions, thickly spread upon coarse cloth or leather. Tar, spread upon cloth, forms an excellent plaister, especially where the main object is to exclude the air. Their application requires some little dexterity of manipulation. Tar is a useful dressing in foot-rot when the healing process has commenced.

A plaister composed of a pound of pitch and two drachms of bees' wax, melted together, and spread while warm on soft leather or linen cloth, is applied with much advantage to the heads of sheep which are sore from the ravages of the maggots of the fly. Some, as a precautionary

measure, smear the head in May with this composition, and scatter a little wool over it; others sew the plaister round the head.

SALVING, OR SMEARING.

The practice of salving or anointing the skin of the sheep, after shearing, with some unctuous preparation is not universal. It is however the ordinary custom in Scotland, and is indeed essential to the health and comfort of sheep exposed to bleak winds in open mountain districts, to heavy mists, and drenching and long-continued rains.

The primary object of smearing is the protection of the skin from the wet and cold; and next, to promote the growth of the wool and improve its character. Besides these objects there are others not unimportant—the prevention of the attacks of insects, the destruction of such as might adhere to the skin, and the healthy action of the skin or the removal of cutaneous affections, for which tar is very efficient. Tar, mixed with butter, in order to counteract its tenacity, is the ordinary salving material; and vast quantities of damaged butter are yearly sent to the grazing districts of Scotland for the use of the sheep-farmers. One serious disadvantage, however, attends the application of tar—it indelibly stains the wool; hence it cannot be used for white goods, and what is more it will not take the finer and more brilliant dyes. Wool thus tar-stained is termed *laid* wool, and sells at a lower ratio than *white* or *unsalved* wool. Yet in exposed situations the necessity of salving is felt, and various unguents have been tried. Instead of butter, whale oil, as an adjunct to tar, has been used, and is recommended by the Hon. W. J. Napier in his *Treatise on Practical Store-farming*; but the tinge of the tar is not obviated by this admixture. Mr. Hogg says, “Of late several compositions have been purposely and extensively tried, in which the spirit of tar has been substituted for tar itself. This has, in some cases, been complained of as too irritating; and there is no doubt that a too free use of spirit of tar is injurious and even fatal. Some of the salves, while they prove to be perfectly well adapted to flocks that are clean, have been found ineffectual either in curing or warding off the scab, a disease which the common salve made of tar and grease seems effectually to resist. When a flock is perfectly clean, olive oil has been found to be the best substance for softening the fleece, and warding

off rain and snow. For clean sheep ‘Taylor’s Salve’ is also suitable, though some English staplers have condemned it. If a tar-salve were made, so as to be free from the impurities of the tar, it might probably answer every purpose. The ordinary proportion of one cwt. of grease to a barrel of tar, might be increased to one and a half cwt.; and when melted together, the impurities of the tar might be suffered to subside and be separated. In this way the tar might not leave a stain upon the wool when scoured. Olive oil seems to impregnate the wool, or to adhere to it more firmly than any other kind of greasy matter; and it has been successfully employed by Mr. Sellar, of Morvich, a first-rate store-farmer in Sutherland.”

Mr. Hogg recommends the following unguent to be rubbed over every part of the animal, after shearing, with a currying brush:—

Train or seal oil, 4 gallons, Imp. meas.
Tar, $\frac{1}{2}$ gallon, Imp. meas.
Oil of Turpentine, 1 pint.
Mix.

Mr. John Graham, of Newbigging, perceiving the disadvantage of tar, as a wool-stainer and yet desirous of smearing his sheep, used the following preparation in which the tar was omitted, yellow resin being used in its stead:—

Butter, 18 lbs.
Hog’s lard, 18 lbs.
Resin, 12 lbs.
Gallipoli oil, 1 gallon.
Mix.

This quantity he found sufficient for fifty or fifty-five sheep; and the cost of smearing each sheep was about $4\frac{1}{2}d$. He found this wool when washed equally valuable with the *white* wool; and it sold for a considerably higher price than the *laid* or tarred wool.

The importance of smearing or salving is undeniable. The use of a small quantity of some oleaginous or greasy application immediately after shearing is now generally acknowledged. “The protection which it affords to the almost denuded skin—its substitution for the natural yolk, which is not in its full quantity immediately secreted—and the softness which it will impart to the wool—are circumstances well deserving attention.”

Here we close our history of the Sheep, its British varieties, and general management.

THE DOG.



BY WILLIAM YOUATT.

THE DOG.

CHAPTER I.

THE EARLY HISTORY AND ZOOLOGICAL CLASSIFICATION OF THE DOG.

THE Dog, next to the human being, ranks highest in the scale of intelligence, and was evidently designed to be the companion and the friend of man. We exact the services of other animals, and, the task being performed, we dismiss them to their accustomed food and rest; but several of the varieties of the dog follow us to our home; they are connected with many of our pleasures and wants, and guard our sleeping hours.

The first animal of the domestication of which we have any account was the sheep. "Abel was a keeper of sheep."* It is difficult to believe that any long time would pass before the dog—who now in every country of the world is the companion of the shepherd, and the director or guardian of the sheep—would be enlisted in the service of man.

From the earliest known history, he was the protector of the habitation of the human being. At the feet of the *lares*, those household deities who were supposed to protect the abodes of men, the figure of a barking dog was often placed. In every age, and almost in every part of the globe, he has played a principal part in the labours, the dangers, and the pleasures of the chase.

In process of time man began to surround himself with many servants from among the lower animals, but among them all he had only one friend—the dog; one animal only whose service was voluntary, and who was susceptible of disinterested affection and gratitude. In every country, and in every time, there has existed between man and the dog a connexion different from that which is observed between him and any other animal. The ox and the sheep submit to our controul, but their affections are principally, if not solely, confined to themselves. They submit to us, but they can rarely be said to love, or even to recognise us, except as connected with the supply of their wants.

The horse will share some of our pleasures. He enjoys the chase as much as does his rider; and, when contending for victory on the course, he feels the full influence of emulation. Remembering the pleasure he has experienced with his master, or the daily supply of food from the hand of the

groom, he often exhibits evident tokens of recognition; but that is founded on a selfish principle—he neighs that he may be fed, and his affections are easily transferred.

The dog is the only animal that is capable of disinterested affection. He is the only one that regards the human being as his companion, and follows him as his friend; the only one that seems to possess a natural desire to be useful to him, or from a spontaneous impulse attaches himself to man. We take the bridle from the mouth of the horse, and turn him free into the pasture, and he testifies his joy in his partially-recovered liberty. We exact from the dog the service that is required of him, and he still follows us. He solicits to be continued as our companion and our friend. Many an expressive action tells us how much he is pleased and thankful. He shares in our abundance, and he is content with the scantiest and most humble fare. He loves us while living, and has been known to pine away on the grave of his master.

As an animal of draught the dog is highly useful in some countries. What would become of the inhabitants of the northern regions, if the dog were not harnessed to the sledge, and the Laplander, and the Greenlander, and the Kamtchatkan drawn, and not unfrequently at the rate of nearly a hundred miles a-day, over the snowy wastes? In Newfoundland, the timber, one of the most important articles of commerce, is drawn to the water-side by the docile but ill-used dog; and we need only to cross the British Channel in order to see how useful, and, generally speaking, how happy a beast of draught the dog can be.

Though in our country, and to its great disgrace, this employment of the dog has been accompanied by such wanton and shameful cruelty, that the legislature—somewhat hastily confounding the abuse of a thing with its legitimate purpose—forbade the appearance of the dog-cart in the metropolitan districts, and were inclined to extend this prohibition through the whole kingdom, it is much to be desired that a kindlier and better feeling may gradually prevail, and that this animal, humanely treated, may return to the discharge of the services of which nature has rendered him capable, and which prove the greatest source of hap-

* Gen. iv. 2.

piness to him while discharging them to the best of his power.

In another and very important particular, as the preserver of human life, the history of the dog will be most interesting. The writer of this work has seen a Newfoundland dog who, on five distinct occasions, preserved the life of a human being; and it is said of the noble quadruped whose remains constitute one of the most interesting specimens in the museum of Berne, that forty persons were rescued by him from impending destruction.

When this friend and servant of man dies, he does not or may not cease to be useful; for in many countries, and to a far greater extent than is generally imagined, his skin is useful for gloves, or leggings, or mats, or hammer-cloths; and, while even the Romans occasionally fattened him for the table, and esteemed his flesh a dainty, many thousands of people in Asia, Africa, and America, now breed him expressly for food.

If the publication of the present work should throw some additional light on the good qualities of this noble animal: if it should enable us to derive more advantage from the services that he can render—to train him more expeditiously and fully for the discharge of those services—to protect him from the abuses to which he is exposed, and to mitigate or remove some of the diseases which his connexion with man has entailed upon him; if any of these purposes be accomplished, we shall derive considerable “useful knowledge,” as well as pleasure, from the perusal of the present volume.

Some controversy has arisen with regard to the origin of the dog. Professor Thomas Bell, to whom we are indebted for a truly valuable history of the British quadrupeds, traces him to the wolf. He says, and it is perfectly true, that the osteology of the wolf does not differ materially from that of the dog more than that of the different kinds of dogs differs; that the cranium is similar, and they agree in nearly all the other essential points; that the dog and wolf will readily breed with each other, and that their progeny, thus obtained, will again mingle with the dog. There is one circumstance, however, which seems to mark a decided difference between the two animals: the eye of the dog, of every country and species, has a circular pupil, but the position or form of the pupil is oblique in the wolf. Professor Bell gives an ingenious but not admissible reason for this. He attributes the forward direction of the eyes in the dog to the constant habit “for many successive generations, of looking towards their master, and obeying his voice;” but no habit of this kind could by possibility produce any such effect. It should also be remembered that, in every part of the globe in which the wolf is found, this form of the pupil,

and a peculiar setting-on of the curve of the tail, and a singularity in the voice, cannot fail of being observed, to which may be added, that the dog exists in every latitude and in every climate, while the habitation of the wolf is confined to certain parts of the globe.

There is also a marked difference in the temper and habits of the two. The dog is, generally speaking, easily manageable; but nothing will, in the majority of cases, render the wolf moderately tractable. There are, however, exceptions to this. The author remembers a bitch wolf at the Zoological Gardens that would always come to the front bars of her den to be caressed as soon as any one that she knew approached. She had puppies while there, and she brought her little ones in her mouth to be noticed by the spectators; so eager, indeed, was she that they should share with her in the notice of her friends, that she killed them all in succession against the bars of her den as she brought them forcibly forward to be fondled.

M. F. Cuvier gives an account of a young wolf who followed his master everywhere, and showed a degree of affection and submission scarcely inferior to the domesticated dog. His master being unavoidably absent, he was sent to the menagerie, where he pined for his loss, and would scarcely take any food for a considerable time. At length, however, he attached himself to his keepers, and appeared to have forgotten his former associate. At the expiration of eighteen months his master returned; and, the moment his voice was heard, the wolf recognised him, and lavished on his old friend the most affectionate caresses. A second separation followed, which lasted three years, and again the long-remembered voice was recognised, and replied to with impatient cries; after which, rushing on his master, he licked his face with every mark of joy, menacing his keepers, towards whom he had just before been exhibiting fondness. A third separation occurred, and he became gloomy and melancholy. He suffered the caresses of none but his keepers, and towards them he often manifested the original ferocity of his species.

These stories, however, go only a little way to prove that the dog and the wolf have one common origin.

It may appear singular that in both the Old Testament and the New the dog was spoken of almost with abhorrence. He ranked among the unclean beasts. The traffic in him and the price of him were considered as an abomination, and were forbidden to be offered in the sanctuary in the discharge of any vow.*

One grand object in the institution of the Jewish ritual was to preserve the Israelites from

* Deut. xxiii. 18.

the idolatry which at that time prevailed among every other people. Dogs were held in considerable veneration by the Egyptians, from whose tyranny the Israelites had just escaped. Figures of them appeared on the friezes of most of the temples,* and they were regarded as emblems of the Divine Being. Herodotus, speaking of the sanctity in which some animals were held by the Egyptians, says that the people of every family in which a dog died, shaved themselves—their expression of mourning—and he adds, that “this was a custom existing in his own time.”†

The cause of this attachment to and veneration for the dog is, however, explained in a far more probable and pleasing way than many of the fables of ancient mythology. The prosperity of Lower Egypt, and almost the very subsistence of its inhabitants, depended on the annual overflowing of the Nile; and they looked for it with the utmost anxiety. Its approach was announced by the appearance of a certain star—SIRIUS. As soon as that star was seen above the horizon, they hastened to remove their flocks to the higher ground, and abandoned the lower pastures to the fertilizing influence of the stream. They hailed it as their guard and protector; and, associating with its apparent watchfulness the well-known fidelity of the dog, they called it the “dog-star,” and they worshipped it. It was in far later periods, and in other countries, that the appearance of the dog-star was regarded as the signal of insufferable heat or prevalent disease.

One of the Egyptian deities — Anubis — is described as having the form and body of a man, but with a dog's head. These were types of sagacity and fidelity.

In Ethiopia, not only was great veneration paid to the dog, but the inhabitants used to elect a dog as their king. He was kept in great state, and surrounded by a numerous train of officers and guards. When he fawned upon them, he was supposed to be pleased with their proceedings; when he growled, he disapproved of the manner in which their government was conducted. These indications of his will were implicitly obeyed, or rather, perhaps, were translated by his worshippers as their own caprice or interest dictated.

Even a thousand years after this period, the dog was highly esteemed in Egypt for its sagacity and other excellent qualities; for when Pythagoras, after his return from Egypt, founded a new sect in Greece, and at Croton, in Southern Italy, he taught, with the Egyptian philosophers, that, at the death of the body, the soul entered into that of

different animals. He used, after the decease of any of his favourite disciples, to cause a dog to be held to the mouth of the dying man, in order to receive his departing spirit; saying that there was no animal that could perpetuate his virtues better than that quadruped.

It was in order to preserve the Israelites from errors and follies like these, and to prevent the possibility of this species of idolatry being established, that the dog was afterwards regarded with utter abhorrence among the Jews.‡ This feeling prevailed during the continuance of the Israelites in Palestine. Even in the New Testament the Apostle warns those to whom he wrote to “beware of dogs and evil-workers;”§ and it is said in The Revelations that “without are dogs and sorcerers,” &c.|| Dogs were, however, employed even by the Jews. Job says, “Now they that are younger than I have me in derision, whose fathers I would have disdained to have set with the dogs of my flock.”¶ Dogs were employed either to guide the sheep or to protect them from wild beasts; and some prowled about the streets at night, contending with each other for the offal that was thrown away.

To a certain degree this dislike of the dog continues to the present day; for, with few exceptions, the dog is seldom the chosen companion of the Jew, or even the inmate of his house. Nor was it originally confined to Palestine. Wherever a knowledge of the Jewish religion spread, or any of its traditions were believed, there arose an abhorrence of the dog. The Mohammedans have always regarded him as an unclean animal, that should never be cherished in any human habitation—belonging to no particular owner, but protecting the street** and the district rather than the house of a master.

The Hindoos regard him likewise as unclean, and submit to various purifications if they accidentally come in contact with him, believing that every dog was animated by a wicked and malignant spirit condemned to do penance in that form for crimes committed in a previous state of existence. If by chance a dog passed between a teacher and his pupil during the period of instruction, it was supposed that the best lesson would be completely poisoned, and it was deemed prudent to suspend the tuition for at least a day and a night. Even in Egypt dogs are now as much avoided as they were venerated. In every Mohammedan and Hindoo country the most scurrilous epithet

† No dog was suffered to come within the precincts of the temple at Jerusalem. *Εἰς κυνὲς* was a prevalent expression among the Jews. Bryant's Mythology, vol. ii., p. 42.

§ Phil. iii. 2.

|| Rev. xvii. 15.

¶ Job xxx. 1. See also Isaiah lvi. 10, 11.

** Psalm lix. 6.

* In some of Belzoni's beautiful sketches of the frieze-work of the old Egyptian temples, the dog appears, with his long ears and broad muzzle, not unlike the old Talbot hound.

† Herodotus, lib. ii., c. 66.

bestowed on a European or a Christian is—"a dog!"*

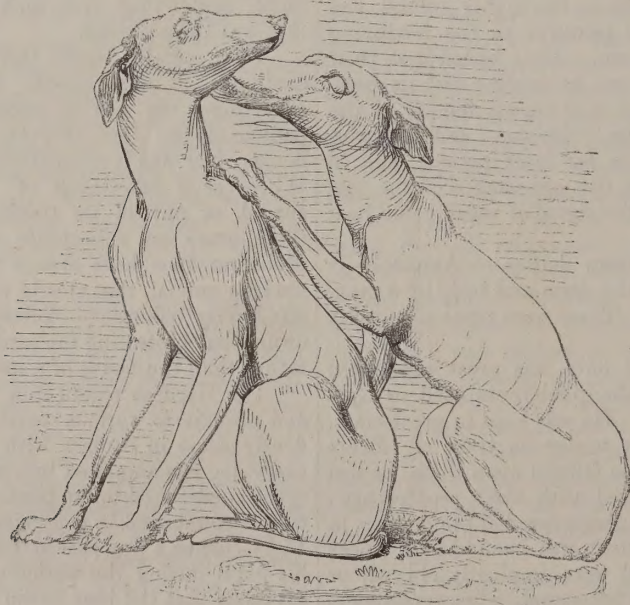
This accounts for the singular fact that in the whole of the Jewish history there is not a single allusion to hunting with dogs. Mention is made of nets and snares, but the dog seems to have been never used in the pursuit of game.

In the early periods of the history of other countries this seems to have been the case even where the dog was esteemed and valued, and had become the companion, the friend, and the defender of man and his home. So late as the second century of the Christian era, the fair hunting of the present day needed the eloquent defence of Arrian, who says that "there is as much difference between a fair trial of speed in a good run, and ensnaring a poor animal without an effort, as between the secret piratical assaults of robbers at sea, and the victorious naval engagements of the Athenians at Artemisium and at Salamis."† The

first hint of the employment of the dog in the pursuit of other animals is given by Oppian in his *Cynegeticus*, who attributes it to Pollux, about 200 years after the promulgation of the Levitical law.

Of the precise species of dog that prevailed or was cultivated in Greece at this early period little can with certainty be affirmed. One beautiful piece of sculpture has been preserved, and is now in the possession of Lord Feversham at Duncombe Hall. It is said to represent the favourite dog of Alcibiades, and to have been the production of Myson, one of the most skilful artists of ancient times. It differs but little from the Newfoundland dog of the present day. He is represented as sitting on his haunches, and earnestly looking at his master. Any one would vouch for the sagacity and fidelity of that animal.

The British Museum contains a group of greyhound puppies of more recent date, from the



ruins of the villa of Antonius, near Rome. One is fondling the other, and the attitude of both, and the characteristic puppy-clumsiness of their limbs, which indicate, nevertheless, the beautiful propor-

tions that will soon be developed, are an admirable specimen of ancient art.

The Greeks in the earlier periods of their history depended too much on their nets; and it was not until later times that they pursued their prey with dogs, and then not with dogs that ran by sight, or succeeded by their swiftness of foot, but by beagles very little superior to those of modern days.‡ Of the stronger and more ferocious dogs there is, however, occasional mention. The

* Carpenter's *Scripture Natural History*, p. 109. It is a remarkable fact that from this faithful animal, the companion of man, and the guardian of his person and property, should originate so many terms of reproach, as "dog," "cur," "hound," "puppy," "dog-cheap," "a dog's trick," "dog-sick," "dog-weary," "to lead the life of a dog," "to use like a dog." All this probably originated in the East, where the dog was held in abhorrence as the common scavenger of the streets.

† Arrian's *Cynegeticus*, cap. 26.

‡ *New Sporting Magazine*, vol. xiv. p. 97.

bull-dog of modern date does not excel the one (possibly of nearly the same race) that was presented to Alexander the Great, and that boldly seized a ferocious lion, or another that would not quit his hold, although one leg and then another was cut off.

It would be difficult and foreign to the object of this work fully to trace the early history of the dog. Both in Greece and in Rome he was highly estimated. Alexander built a city in honour of a dog; and the Emperor Hadrian decreed the most solemn rites of sepulture to another, on account of his sagacity and fidelity.

The translator of Arrian imagines that the use of the *pugnaces* (fighting) and the *sagaces* (intelligent)—the more ferocious dogs, and those who artfully circumvented and caught their prey—was known in the earlier periods of Greek and Roman history, but that the *celeres*, the dogs of speed, the greyhounds of every kind, were peculiar to the British islands, or to the western and northern continents of Europe, the interior and the produce of which were in those days unknown to the Greeks and Romans. By most authors who have inquired into the origin of these varieties of the dog, the *sagaces* have been generally assigned to Greece—the *pugnaces* to Asia—and the *celeres* to the Celtic nations.

Of the aboriginal country of the latter there can be little doubt; but the accounts that are given of the English mastiff at the invasion of Britain by the Romans, and the early history of the English hound, which was once peculiar to this country, and at the present day degenerates in every other, would go far to prove that these breeds also are indigenous to our island.

Oppian thus describes the hunting dog as he finds him in Britain:—"There is, besides, an excellent kind of scenting dogs, though small, yet worthy of estimation. They are fed by the fierce nation of painted Britons, who call them *agasæi*. In size they resemble worthless greedy house-dogs that gape under tables. They are crooked, lean, coarse-haired, and heavy-eyed, but armed with powerful claws and deadly teeth. The *agasæus* is of good nose, and most excellent in following scent."*

Among the savage dogs of ancient times were the Hyrcanian, said, on account of their extreme ferocity, to have been crossed with the tiger—the Locrian, chiefly employed in hunting the boar—the Pannonian, used in war as well as in the chase, and by whom the first charge on the enemy was always made—and the Molossian, of Epirus, likewise trained to war, as well as to the honours of the amphitheatre, and the dangers of the chase. This last breed had one redeeming quality—an

inviolable attachment to their owners. This attachment was reciprocal; for it is said that the Molossi used to weep over their faithful quadruped companions slain in war.

Ælian relates that one of them, and his owner, so much distinguished themselves at the battle of Marathon, that the effigy of the dog was placed on the same tablet with that of his master.

Soon after Britain was discovered the *pugnaces* of Epirus were pitted against those of our island, and, according to the testimony of Gratus, completely beaten. A variety of this class, but as large and as ferocious, was employed to guard the sheep and cattle, or to watch at the door of the house, or to follow the owner on any excursion of business or of pleasure. Gratus says of these dogs, that they have no pretensions to the deceitful commendation of form; but, at the time of need, when courage is required of them, most excellent mastiffs are not to be preferred to them.

The account of the British *pugnaces* of former times, and also of the *sagaces* and *celeres*, will be best given when treating of their present state and comparative value. In describing the different breeds of dogs, some anecdotes will be related of their sagacity and fidelity; a few previous remarks, however, may be admissible.

A young man lost his life by falling from one of the precipices of the Helvellyn mountains. Three months afterwards his remains were discovered at the bottom of a ravine, and his faithful dog, almost a skeleton, still guarding them. Sir Walter Scott beautifully describes the scene:—

"Dark-green was the spot, 'mid the brown mountain heather
Where the pilgrim of nature lay stretched in decay;
Like the corpse of an outcast, abandoned to weather,
Till the mountain winds wasted the tenantless clay;
Nor yet quite deserted, though lonely extended,
For, faithful in death, his mute favourite attended,
The much-loved remains of her master defended,
And chased the hill-fox and the raven away.
How long didst thou think that his silence was slumber?
When the wind waved his garments how oft didst thou start?
How many long days and long weeks didst thou number
Ere he faded before thee, the friend of thy heart?"

Burchell, in his Travels in Africa, places the connexion between man and the dog, and the good qualities of this animal, in an interesting point of view. A pack of dogs of various descriptions formed a necessary part of his caravan, occasionally to provide him with food, but oftener to defend him from wild beasts or robbers. "While almost every other quadruped fears man as his most formidable enemy," says this interesting traveller, "there is one who regards him as his companion, and follows him as his friend. We must not mistake the nature of the case. It is not because we train him to our use, and have made choice of him in preference to other animals, but because this particular species of animal feels a natural desire to be useful to man, and, from

* Oppian's *Cynegeticus*, lib. i. v. 468—480.

spontaneous impulse, attaches himself to him. Were it not so, we should see in various countries an equal familiarity with other quadrupeds, according to their habits, and the taste or caprices of different nations; but everywhere it is the dog only that takes delight in associating with us, and in sharing our abode. It is he who knows us personally, watches over us, and warns us of danger. It is impossible for the naturalist not to feel a conviction that this friendship between creatures so different from each other must be the result of the laws of nature; nor can the humane and feeling mind avoid the belief that kindness to those animals, from which he derives continued and essential assistance, is part of the moral duty of man.

"Often in the silence of the night, when all my people have been fast asleep around the fire, have I stood to contemplate these faithful animals watching by their side, and have learned to esteem them for their social inclination towards mankind. When, wandering over pathless deserts, oppressed with vexation and distress at the conduct of my own men, I have turned to these as my only friends, and felt how much inferior to them was man, when actuated only by selfish views."

Of the stanchness and incorruptible fidelity of the dog, and his disregard of personal inconvenience and want, when employed in our service, it is impossible to entertain a doubt. We have sometimes thought that the attachment of the dog to its master was increased, or at least the exhibition of it, by the penury of the owner. At all events one fact is plain enough, that, while poverty drives away from us many a companion of our happier hours, it was never known to diminish the love of our quadruped friend.

The early history of the dog has been described, and the abomination in which he was held by the Israelites. At no great distance of time, however, we find him, almost in the neighbourhood of Palestine, in one of the islands of the Ionian Sea, the companion and the friend of princes, and deserving their regard. The reader will forgive a somewhat abbreviated account of the last meeting of Ulysses and his dog.

Twenty years had passed since Argus, the favourite dog of Ulysses, had been parted from his master. The monarch at length wended his way homewards, and, disguised as a beggar, for his life would have been sacrificed had he been known, stood at the entrance of his palace-door. There he met with an old dependent, who had formerly served him with fidelity and who was yet faithful to his memory; but age, and hardship, and care, and the disguise which he now wore, had so altered the wanderer that the good Eumæus had not the most distant suspicion with whom he was conversing; but—

"Near to the gates, conferring as they drew,
Argus the dog his ancient master knew,
And, not unconscious of the voice and tread,
Lifts to the sound his ears, and rears his head.
He knew his Lord, he knew, and strove to meet;
In vain he strove to crawl and kiss his feet:
Yet, all he could, his tail, his ears, his eyes
Salute his master, and confess his joys."*

In Daniel's Rural Sports, the account of a nobleman and his dog is given. The nobleman had been absent two years on foreign service. On his return this faithful creature was the first to recognise him, as he came through the court-yard, and he flew to welcome his old master and friend. He sprung upon him; his agitation and his joy knew not any bounds; and at length, in the fulness of his transport, he fell at his master's feet and expired.

We will not further pursue this part of our subject at present. We shall have other opportunities of speaking of the disinterested and devoted affection which this noble animal is capable of displaying when he occupies his proper situation, and discharges those offices for which nature designed him. It may, however, be added that this power of tracing back the dog to the very earliest periods of history, and the fact that he then seemed to be as sagacious, as faithful, and as valuable as at the present day, strongly favour the opinion that he descended from no inferior and comparatively worthless animal; that he was not the progeny of the wolf, the jackal, or the fox, but he was originally created, somewhat as we now find him, the associate and the friend of man.

If, within the first thousand years after the Deluge, we observe that divine honours were paid to him, we can scarcely be brought to believe his wolfish genealogy. The most savage animals are capable of affection for those to whom they have been accustomed, and by whom they have been well treated, and therefore we give full credit to several accounts of this sort related of the wolf, the lion, and even the cat and the reptile; but in no other animal—in no other, even in the genus *Canis*—do we find the qualities of the domestic dog, or the slightest approach to them. "To his master he flies with alacrity," says the eloquent Buffon, "and submissively lays at his feet all his courage, strength, and talent. A glance of the eye is sufficient: for he understands the smallest indications of his will. He has all the ardour of friendship and fidelity and constancy in his affections, which man can have. Neither interest nor desire of revenge can corrupt him; and he has no fear but that of displeasing. He is all zeal and obedience. He speedily forgets ill-usage, or only recollects it to make returning attachment the stronger. He licks the hand which causes him pain, and subdues his anger by submission. The training of the dog seems to have been the first art

* Pope's *Odyssey*, xvii.

invented by man, and the fruit of that art was the conquest and peaceable possession of the earth." "Man," says Burns, "is the God of the dog; he knows no other; and see how he worships him. With what reverence he crouches at his feet—with what reverence he looks up to him—with what delight he fawns upon him, and with what cheerful alacrity he obeys him!"

If any of the lower animals bear about them the impress of the Divine hand, it is found in the dog: many others are plainly and decidedly more or less connected with the welfare of the human being; but this connection and its effects are limited to a few points, or often to one alone. The dog, different, yet the same, in every region, seems to be formed expressly to administer to our comforts and to our pleasure. He displays a versatility, and yet a perfect unity of power and character, which mark him as our destined servant, and, still more, as our companion and friend. Other animals may be brought to a certain degree of familiarity, and may display much affection and gratitude. There was scarcely an animal in the menagerie of the Zoological Society that did not acknowledge the superintendent as his friend; but it was only a casual intercourse, and might be dissolved by a word or look. At the hour of feeding the brute principle reigned supreme, and the companion of other hours would be sacrificed if he dared to interfere; but the connection between man and the dog no lapse of time, no change of circumstances, no infliction of evil can dissolve. We must, therefore, look far beyond the wolf for the prototype of the dog.

Cuvier eloquently states that the dog exhibits the most complete and the most useful conquest that man has made. Each individual is entirely devoted to his master, adopts his manners, distinguishes and defends his property, and remains attached to him even unto death; and all this springing not from mere necessity or from constraint, but simply from gratitude and true friendship. The swiftness, the strength, and the highly developed power of smelling of the dog, have made him a powerful ally of man against the other animals; and, perhaps, these qualities in the dog were necessary to the establishment of society. It is the only animal that has followed the human being all over the earth.

There is occasionally a friendship existing between dogs resembling that which is found in the human being. The author pledges himself as to the accuracy of the following little anecdote. Two dogs, the property of a gentleman at Shrewsbury, had been companions for many years, until one of them died of old age. The survivor immediately began to manifest an extraordinary degree of restless anxiety, searching for his old associate in all his former haunts, and refusing every kind of food. He gradually wasted away, and, at the expiration

of the tenth day, he died, the victim of an attachment that would have done honour to man.

The Dog belongs to the division of animals termed VERTEBRATED (see vol. i., p. 262), because it has a cranium or skull, and a spine or range of VERTEBRÆ proceeding from it. It ranks under the class MAMMALIA, because it has teats, by which the female suckles her young; the tribe UNGUICULATA, because its extremities are armed with nails; the order DIGITIGRADES, because it walks principally on its toes. The genus CANIS has two tubercular teeth behind the large carnivorous tooth in the upper jaw; and the sub-genus *familiaris*, the Dog, has the pupils of the eye circular, while those of the wolf are oblique, and those of the fox upright and long.

There has been some dispute whether the various species of dogs are of different origin, or sprung from one common source. When we consider the change that climate and breeding effect in the same species of dog, and contrast the rough Irish or Highland greyhound with the smoother one of the southern parts of Britain, or the more delicate one of Greece, or the diminutive but beautifully formed one of Italy, or the hairless one of Africa or Brazil—or the small Blenheim spaniel with the magnificent Newfoundland; if also we observe many of them varied by accident, and that accidental variety diligently cultivated into a new species, altogether different in form or use, we shall find no difficulty in believing that they might be derived from one common origin.

One of the most striking proofs of the influence of climate on the form and character of this animal, occurs in the bull-dog. When transported to India he becomes, in a few years, greatly altered in form, loses all his former courage and ferocity, and becomes a perfect coward.

It is probable that all dogs sprung from one common source, but climate, food, and cross-breeding caused variations of form, which suggested particular uses; and these being either designedly or accidentally perpetuated, the various breeds of dogs thus arose, and they have become numerous in proportion to the progress of civilization. Among the ruder or savage tribes they possess but one form; but the ingenuity of man has devised many inventions to increase his comforts: he has varied and multiplied the characters and kinds of domestic animals for the same purpose, and hence the various breeds of horses, and cattle, and dogs.

The parent stock it is now impossible to trace; but the wild dog, wherever found on the continent of Asia or Northern Europe, has nearly the same character, and bears no inconsiderable resemblance to the British fox-dog, while many of those from the Southern Ocean can scarcely be distinguished from the English lurcher. There is, however, no more difficulty in this respect with regard to the

dog than any other of our domesticated animals. Climate, or chance, produced a change in certain individuals, and the sagacity of man, or perhaps mere chance, founded on these accidental varieties numerous breeds possessed of certain distinct characteristic properties. The degeneracy of the dog, also, in different countries, cannot for a moment be disputed.

The most natural arrangement of all the varieties of the dog is according to the development of the frontal sinus and the cerebral cavity, or, in other words, the power of scent, and the degree of intelligence. This classification originated with M. F. Cuvier, and has been adopted by most naturalists. He reckoned three divisions of the dog:—

I. Those having the head more or less elongated, and the parietal bones of the skull widest at the base and gradually approaching towards each

other as they ascend, the condyls of the lower jaw being on the same line with the upper molar teeth. The *Greyhound* and all its varieties belong to this class.

II. The head moderately elongated, and the parietals diverging from each other for a certain space as they rise upon the side of the head, enlarging the cerebral cavity and the frontal sinus. To this class belong our most valuable dogs—the *Spaniel*, *Setter*, *Pointer*, *Hound*, and the *Sheep-dog*.

III. The muzzle more or less shortened, the frontal sinus enlarged, and the cranium elevated, and diminished in capacity. To this class belong some of the *Terriers*, and a great many dogs that might very well be spared.

This division of the different species of the dog is adopted here as being the most simple, intelligible, and satisfactory.

CHAPTER II.

THE VARIETIES OF THE DOG.



THE THIBET DOG.

FIRST DIVISION.

The head more or less elongated, the parietal bones widest at the base, and gradually approaching

to each other as they ascend, and the condyls of the lower jaw being on the same line with the upper molar teeth.

To this division belong the greater number of the

WILD DOGS.

The wild dog, as existing in considerable numbers or communities, seems to be nearly extirpated in the southern parts of Europe; but there are several cases on record of dogs, having assumed the character of the wild race from which they had descended, abandoning their state of domestication, and re-asserting their native independence. A black greyhound bitch, belonging to a gentleman in Scarisbrick, in Lancashire, though she had apparently been well broken in, and always well used, ran away from the habitation of her master, and betook herself to the woods. She killed a great number of hares, and made free with the sheep, and became an intolerable nuisance to the neighbourhood. She was occasionally seen, and the depredations that were committed were brought home to her. Many were the attempts made to entrap or destroy her; but in vain: for more than six months she eluded the vigilance of her pursuers. At length she was observed to creep into a hole in an old barn. She was caught as she came out, and the barn being searched three whelps were found, which, very foolishly, were destroyed.

The bitch evinced the utmost ferocity, and, although well secured, attempted to seize every one who approached her. She was, however, dragged home and treated with kindness. By degrees her ferocity abated. In the course of two months she became perfectly reconciled to her original abode, and a twelvemonth afterwards (1822) she ran successfully several courses. There was still a degree of wildness in her appearance; but, although at perfect liberty, she seemed to be altogether reconciled to a domestic life.

In 1784 a dog was left by a smuggling vessel on the coast of Northumberland. He soon began to worry the sheep for his subsistence, and did so much mischief that he caused very considerable alarm. He was frequently pursued by hounds and greyhounds; but when the dogs came up he lay upon his back, as if supplicating for mercy, and in that position they would never hurt him. He therefore lay quietly until the hunters approached, when he made off without being followed by the hounds until they were again excited to the pursuit. He one day led them thirty miles in this way. It was more than three months before he was caught, and was then shot.*

A dog with every character of the wild one, has occasionally been seen in some of the forests of Germany, and among the Pyrenean mountains; but he has rarely been found gregarious there. In the country on the eastern side of the Gulf of

Venice wild dogs are more frequent. They increase in the Austrian and Turkish dominions, and are found on almost every part of the coast of the Black Sea, but even there they rarely gather in flocks; they do not howl in concert, as the wolf, nor are they the precursors of other and larger beasts, like the jackal. Most of these dogs have the muzzle and head elongated, the ears erect, triangular, and small, the body and neck large and muscular, and the tail short, but with a brush of crisped hair. In many parts of Arabia the wild dog—or *dakhun*—is occasionally found. In Persia, they are most decidedly congregated together, and still more so in almost every part of India.†

Mr. Hodgson has favoured the Zoological Society with an account of

THE WILD DOG OF NEPAL,

the *buānsū*, and, finding it more or less prevailing through the whole of Northern India, and even southward of the coast of Coromandel, he thought that he had discovered the primitive race of the dog. This is a point that can never be decided. "These dogs hunt their prey by night, as well as by day, in packs of from six to ten individuals, maintaining the chase more by the scent than by the eye, and generally succeeding by dint of strength and perseverance. While hunting, they bark like the hound, yet the bark is peculiar and equally unlike that of the cultivated breeds of dogs, and the cries of the jackal and the fox." Bishop Heber gives the following account of them: "They are larger and stronger than a fox, which in the circumstances of form and fur they much resemble. They hunt, however, in packs, give tongue like dogs, and possess an exquisite scent. They make, of course, tremendous havoc among the game in these hills; but that mischief they are said amply to repay by destroying wild beasts, and even tigers."‡

Wild dogs are susceptible of certain social combinations. In Egypt, Constantinople, and throughout the whole of the East, there are in every village troops of wandering dogs who belong to no particular person. Each troop has its own

* The superstition of the Arabians and Turks with regard to dogs is somewhat singular; neither have they much affection for these animals, or suffer them to be in or near the camp, except to guard it in the night. They have, however, some charity for the females that have whelps. As for other dogs, they feed them well, and give them good words, but never touch them nor go near them, because dogs are regarded as unclean animals. They particularly drive them away in wet weather; for if one drop of water from a dog should fall on their raiment, their devotion would be interrupted and useless. They who are fond of hunting make their religion subservient to their pleasure, and say that greyhounds and setters are excepted from the general rule, because when not running these dogs are tied up where nothing unclean can reach them, and they are never suffered to eat anything unclean. Their opinion is the same with regard to small dogs, which are kept with great care, and no one willingly injures a dog, or, if he should injure purposely, or destroy one of them, the law would punish him. Chevalier Darvieux's Travels in Arabia Deserta, 1718, p. 155.

† Heber's Narrative, p. 560.

* Annals of Sporting, vol. vi., p. 99.

quarter of the place; and, if any wander into a quarter which does not belong to him, its inhabitants unite together and chase him out. At the Cape of Good Hope there are many dogs half-starved. On going from home the natives induce two or more of these animals to accompany them, warn them of the approach of any ferocious animal, and, if any of the jackals approach the walls during the night, they utter the most piercing cries, and at this signal every dog sallies out, and, uniting together, put the jackals to speedy flight.*

The wild Nepál dogs caught when at an adult age make no approach towards domestication; but a young one, which Mr. Hodgson obtained when it was not more than a month old, became sensible to caresses, and manifested as much intelligence as any sporting dog of the same age.†

Captain T. Williamson gives an interesting account of the ferocious character of some of these wild dogs. "They have considerable resemblance to the jackal in form. They are remarkably savage, and frequently will approach none but their *doonahs* or keepers, not allowing their own masters to come near them. Some of them are very fleet; but they are not to be depended upon in coursing; for they are apt suddenly to give up the chase when it is a severe one, and indeed they will too often prefer a sheep or a goat to a hare. In hog-hunting they are more valuable. It seems to suit their temper, and they appear to enjoy the snapping and the snarling incident to that species of sports."

He says that many persons affect to treat the idea of degeneration in quadrupeds with ridicule; but all who have been any considerable time resident in India must be satisfied that dogs of European breed become, after every successive generation, more and more similar to the pariah, or indigenous dog of that country. The hounds are the most rapid in their decline, and, except in the form of their ears, they are very much like many of the village curs. Greyhounds and pointers also rapidly decline, although with occasional exceptions. Spaniels and terriers deteriorate less, and spaniels of eight or nine generations, and without a cross from Europe, are not only as good as, but far more beautiful than their ancestors. The climate is too severe for mastiffs, and they do not possess sufficient stamina; but crossed by the East Indian greyhound they are invaluable in hunting the hog.‡

Colonel Sykes, at one of the meetings of the Zoological Society, produced a specimen of

THE WILD DOG OF DAKHUN,

or Deccan, a part of India far to the south of Nepál, and gave the following description of this

supposed primitive dog:—"Its head is compressed and elongated, but its muzzle not very sharp. The eyes are oblique, the pupils round, and the *irides* light brown. The expression of the countenance is that of a coarse ill-natured Persian greyhound, without any resemblance to the jackal, the fox, or the wolf. The ears are long, erect, and somewhat rounded at the top. The limbs remarkably large and strong in relation to the bulk of the animal. The size is intermediate between the wolf and the jackal. The neck long, the body elongated, and the entire dog of a red-brown colour." None of the domesticated dogs of Dakhun are common in Europe, but those of Dakhun and Nepál are very similar in all their characters. There is also a dog in Dakhun with hair so short as to make him appear naked. It is called the *polugar* dog.

THE WILD DOG OF THE MAHRATTAS

possesses a similar conformation; and the fact is, that the East Indian wild dog is essentially the same in every part of that immense extent of country. There is no more reason, however, for concluding that it was the primitive dog, than for conferring on the Indian cattle the same honour among the ruminants. The truth of the matter is that we have no guide what was the original breed in any country. The lapse of 4000 years would effect strange alterations in the breeds. The common name of this dog, in the track lying between South Bahar and the Mahratta frontier towards Maghore, is

DHOLE,

the *Chryseus Scylex* of Hamilton Smith.

Captain Williamson, in his *Oriental Field Sports*, gives the following account of the dholes:

"They are to be found chiefly, or only, in the country from Midnapore to Chamu, and even there are not often to be met with. They are of the size of a small greyhound. Their countenance is enlivened by unusually brilliant eyes. Their body, which is slender and deep-chested, is thinly covered by a coat of hair of a reddish-brown or bay colour. The tail is dark towards its extremity. The limbs are light, compact, and strong, and equally calculated for speed and power. They resemble many of the common pariah dogs in form, but the singularity of their colour and marks at once demonstrate an evident distinction.

"These dogs are said to be perfectly harmless if unmolested. They do not willingly approach persons; but, if they chance to meet any in their course, they do not show any particular anxiety to escape. They view the human race rather as objects of curiosity, than either of apprehension or enmity. The natives who reside near the Ranochitty and Katsunsandy passes, in which vicinity the *dholes* may frequently be seen, describe them as confining their attacks entirely to wild animals,

* Histoire du Chien, par Elzéar Blaze, p. 54

† Proceedings of the Zoological Society, Part I., 1833.

‡ Williamson's *Oriental Field Sports*.

and assert that they will not prey on sheep, goats, &c.; but others, in the country extending southward from Jelinah and Mechungunge, maintain that cattle are frequently lost by their depredations. I am inclined to believe that the *dhole* is not particularly ceremonious, but will, when opportunity offers, and a meal is wanting, obtain it at the expense of the neighbouring village.

"The peasants likewise state that the *dhole* is eager in proportion to the size and powers of the animal he hunts, preferring the elk to every other kind of deer, and particularly seeking the royal tiger. It is probable that the *dhole* is the principal check on the multiplication of the tiger; and, although incapable individually, or perhaps in small numbers, to effect the destruction of so large and ferocious an animal, may, from their custom of hunting in packs, easily overcome any smaller beast found in the wilds of India.

"They run mute, except that they sometimes utter a whimpering kind of note, similar to that sometimes expressed by dogs when approaching their prey. This may be expressive of their own gratification, or anxiety, or may serve as a guide to other *dholes* to join in the chase. The speed of the *dhole* is so strongly marked in his form as to render it probable no animal in the catalogue of game could escape him for any distance. Many of the *dholes* are destroyed in these contests; for the tiger, the elk, and the boar, and even many of the smaller classes of game, are capable of making a most obstinate defence. Hence the breed of the *dholes* is much circumscribed."

THE THIBET DOG.

Mr. Bennett, in his scientific and amusing description of the Zoological Gardens, gave the best account we have of this noble dog, and the portrait at the head of this chapter is a most faithful likeness of him. He is bred in the table land of the Himalaya mountains bordering on Thibet. The Bhoteas, by whom many of them are carefully reared, come down to the low countries at certain seasons of the year to sell their borax and musk. The women remain at home, and they and the flocks are most sedulously guarded by these dogs. They are the defenders of almost every considerable mansion in Thibet. In an account of an embassy to the court of the Teshoo Llama in Thibet, the author says, that he had to pass by a row of wooden cages containing a number of large dogs, fierce, strong, and noisy. They were natives of Thibet, and whether savage by nature, or soured by confinement, they were so impetuously furious that it was unsafe even to approach their dens. Every writer who describes these dogs, speaks of their noble size, and their ferocity, and antipathy to strangers.

It is said however that the Thibet dog rapidly

degenerates when removed from its native country, and certainly the specimens which have reached the Zoological Gardens exhibited nothing of ferocity. The one that was in that menagerie had a noble and commanding appearance; but he never attempted to do any injury.

The colour of the Thibet dog is of a deep black, slightly clouded on the sides, his feet alone and a spot over each eye being of a full tawny or bright brown hue. He has the broad short truncated muzzle of the mastiff, and the lips are still more deeply pendulous. There is also a singular general looseness of the skin on every part of him.

THE PARIAH.

There are several varieties of this dog. There is a wild breed very numerous in the jungles and in some of the lower ranges of the Himalaya mountains. They usually hunt in packs, and it is not often that their prey escapes them. They generally are very thin, and of a reddish-brown colour, with sharp-pointed ears, deep chest, and tucked-up flanks. Many persons hunt with these dogs singly, and they are very useful. They bring the hog to bay, or indicate the course that he has taken, or distract his attention when the sportsman is at hand.

There is also in every inhabited part of the country the poor desolate pariah—unowned by any one—daring to enter into no house, but wandering about, and picking up a living in any way that he can. He is however of a superior race to the wild dog, and belongs to the second class of the dog, although mentioned here in order that we may altogether quit the dog of India. They are neglected by the Hindoos; but the Mohammedans of India, and other strangers, consider it an act of charity to throw out occasionally a morsel of food to them. They are most of them mongrels; but the benevolent Bishop Heber does them no more than justice when he says that he "was forcibly struck at finding the same dog-like and amiable qualities in these neglected animals as in their more fortunate brethren in Europe."

Colonel Sykes says of these outcasts that among the pariahs is frequently found the turnspit-dog. There is also a small petted variety of the pariah, usually of a white colour, and with long silky hair. This animal is taught to carry flambeaux and lanterns.

According to Captain Williamson, in some of the ditches of the Carnatic forts, alligators are purposely kept, and all the pariah dogs found in the forts are thrown into the ditches as provision for these monsters. Some persons who have kept tigers in cages have adopted the same means of supply for their royal captives, putting the poor pariah through an aperture made for the purpose in the cage; and they justify themselves by assert-

ing that they thus get rid of a troublesome breed of curs, most of which are unappropriated, and which being numerous are very troublesome to passengers, often wantonly biting them, and raising a yelling noise at night, that sets all attempts to rest at defiance.

It did not always happen that the tiger killed the pariah put into his cage. "I knew an instance," says Captain Williamson, "of one that was destined for the tiger's daily meal, standing on the defensive in a manner that completely astonished both the tiger and the spectator. He crept into a corner, and whenever the tiger approached, seized him by the lip or the neck, making him roar most piteously. The tiger, however, impelled by hunger—for all supply of food was purposely withheld—would renew the attack. The result was ever the same. At length the tiger began to treat the dog with more deference, and not only allowed him to partake of the mess of rice and milk furnished daily for his subsistence, but even refrained from any attempt to disturb him. The two animals at length became reconciled to each other, and a strong attachment was formed between them. The dog was then allowed ingress and egress through the aperture; and, considering the cage as his home, he left it and returned to it just as he thought proper. When the tiger died he moaned the loss of his companion for a considerable period."

A wild variety exists in Sumatra. It is described by Cuvier as "possessing the countenance of a fox, the eyes oblique, the ears rounded and hairy, the muzzle of a foxy-brown colour, the tail bushy and pendulous, very lively, running with the head lifted high, and the ears straight." This animal can scarcely be rendered tractable, and even when he is apparently tamed can rarely be depended upon.

As we proceed through the Indian Archipelago, towards Australasia, we skirt the coast of Java. Every Javanese of rank has large packs of dogs with which he hunts the muntjak, the deer of that country. The dogs are led in strings by the attendants until they scent the prey: they are then unloosed, while the sportsmen follow, but not at the speed which would distinguish the British sportsman. The animal is generally found at bay. The male muntjak usually exhibits considerable courage, and probably several of the dogs have been wounded by his tusks. As soon as they come up every gun is discharged, and the animal almost immediately drops. At other times the mounted sportsmen attack them with a spear or sword. Generally the muntjak does not go off like the stag in any direct track, but takes a circular course, and soon returns to the spot whence it was started. It perhaps makes several of these circles, and at length entangles itself in a thicket, where it is secured.

These dogs are the indigenous breed of the island, the body lank, the ears erect, ferocious in their disposition, and with very little attachment to their masters. Such is the account given of them by Dr. Horsfield.

THE DINGO, AUSTRALASIAN, OR NEW HOLLAND DOG.

The newly discovered southern continent was, and some of it still continues to be, overrun by the native wild dogs. Dampier describes them, at the close of the last century, as "beasts like the hungry wolves, lean like so many skeletons, and being nothing but skin and bone." It was not until the publication of Governor Phillip's voyage to Botany Bay, that any accurate description or figure of this dog could be obtained. He approaches in appearance to the largest kind of shepherd's dog. The head is elongated, the forehead flat, and the ears short and erect, or with a slight direction forwards. The body is thickly covered with hair of two kinds—the one woolly and gray, the other silky and of a deep yellow or fawn colour. The limbs are muscular, and, were it not for the suspicious yet ferocious glare of the eye, he might pass for a handsome dog. The Australasian dog, according to M. Desmarest, resembles in form and in the proportion of his limbs the common shepherd's dog. He is very active and courageous, covered in some parts with thick hair, woolly and gray, in other parts becoming of a yellowish-red colour, and under the belly having a whitish hue. When he is running, the head is lifted more than usual in dogs, and the tail is carried horizontally. He seldom barks. Mr. Bennett observes that "dogs in a state of nature never bark. They simply whine, howl, or growl. The explosive noise of the bark is only found among those that are domesticated." Sonnini speaks of the shepherd's dogs in the wilds of Egypt as not having this faculty; and Columbus found the dogs which he had previously carried to America, almost to have lost their propensity to bark.

He does, however, occasionally bark, and has the same kind of snarling voice which the larger dogs generally have. The Australasian dogs that have been brought to Europe have usually been of a savage and untractable disposition.

Many of these Australasian dogs have been domiciled in the gardens of the Zoological Society of London. But though inmates of that establishment in one instance for nine years, and in others for more than five years, not an individual has acquired the bark of the other dogs by which they have been surrounded. When a stranger makes his appearance, or when the hour of feeding arrives, the howl of the Australasian is the first sound that is heard, and it is louder than all the rest.

If some of them have thrown off a portion of their native ferocity, others retain it undiminished. A bitch and two of her whelps, nearly half grown—a male and female—had inhabited the same cage from the time that the young ones were born. Some cause of quarrel occurred on a certain night,

and the two bitches fell upon the dog and perfectly destroyed him. There was not a limb left whole. A stronger instance of the innate ferocity of this breed could scarcely be given. Even in their native country all attempts perfectly to domesticate them have failed; for they never lose an oppor-



THE DINGO.

tunity to devour the poultry or attack the sheep. Every domesticated dog coming within their reach was immediately destroyed. One that was brought to England broke his chain, scoured the surrounding country, and before dawn had destroyed several sheep; and another attacked and would have destroyed an ass if he had not been prevented.

Mr. Oxley, Surveyor-General of New South Wales, however, gives an interesting account of the mutual attachment between two of the native and wild New Holland dingos. "About a week ago we killed a native dog, and threw his body on a small bush. On returning past the same spot to-day, we found the body removed three or four yards from the bush, and the female in a dying state lying close beside it; she had apparently been there from the day the dog was killed. Being now so weakened and emaciated as to be unable to move on our approach, it was deemed a mercy to dispatch her."

When Van Diemen Land began to be colonized by Europeans, the losses sustained by the settlers by the ravages of the wild dogs were almost incredible. The districts infested by these animals were principally those appropriated to sheep, and there was scarcely a flock that did not suffer. It was in vain to double the number of shepherds, to watch by night and by day, or to have fires at

every quarter of the fold; for these animals would accomplish their object by stratagem or by force. One colony lost no fewer than 1200 sheep and lambs in three months; another colony lost 700.

The ravagers were either the native wild dogs of the island or those that had escaped from their owners. They seemed to have apportioned the country into different districts, each troop having its allotted range. At length the evil became so great that a general meeting of the colonists was convened. The concluding sentences of the speech of Lieutenant Hill forcibly express the extent of the evil. "The country is free from bush-rangers: we are no longer surrounded and threatened by the natives. We have only one enemy left in the field; but that enemy strikes at the very root of our welfare, and through him the stream of our prosperity is tainted at its very source." The colonists were then few, but they cordially united in the endeavour to extirpate this formidable enemy; and, although the wild dog is still found in the interior of the island, he is comparatively seldom seen, and his ravages have nearly ceased.

THE CANIS AUSTRALIS—KARÁRÁHÉ, NEW ZEALAND DOG.

A tradition exists in New Zealand of this dog having been given to the natives two or three

centuries ago by a number of divinities who made their descent on these shores, probably Juan Fernandez and his companions. The sagacious animal has, however, dwindled down to the lowest rank of his family, but ill usage has not altogether destroyed his worth. In New Zealand he is the safeguard of every village. Should the slightest alarm exist, he is the first to ascertain the cause of it, and many families have saved themselves by flight, or have taken arms in self-defence against the incursions of predatory bands. The New Zealanders are therefore kind in their treatment of the dog, except that they occasionally destroy him for his hide.

The name formerly given to the New Zealand dog was *pero*, which in some measure substantiates the supposition of Juan Fernandez having visited the country—*perro*, in the Spanish language, being the name of a dog.

We will now turn to the northern parts of America. The races of wild dogs are there considerably limited, both in number and the districts which they occupy.

In the elevated sandy country north of the source of the Missouri, inhabited by the "Stone" and the "Black Foot" Indians, is a doubtful species of dogs—wolves they used to be called—who hunt in large packs and are exceedingly swift; whose bark is similar to that of the domestic dog, but who burrow in the ground, and eagerly run to their holes when the gun of the hunter is heard. The habit of selecting large, open, sandy plains, and burrowing there, extends to the greater part of the American wild dogs.

In some parts of North America whole troops of horses are guarded and kept together by dogs. If any of the troop attempt to steal away, the dog will immediately fly after the horse, head him, and bring him back to his companions.

The wild dogs abound in many parts of South America. In some of the forests on the banks of the Oronoko they multiply to an annoying degree. The Cayotte of Mexico, described by some as a wolf, and bearing no slight resemblance to that animal, belongs to the South American wild dogs, as do also the Aguara dogs of every kind. These wanderers of the woods are, however, diminished in numbers in every part of that continent, and are replaced by other kinds, many of which have been imported from Europe and domesticated. Many of the Indian tribes have succeeded in reclaiming the dog of the woods, and have made him a useful although not a perfectly attached servant.

The dogs of the Falkland Islands, and the Indian North American dogs generally, are brown or gray-coloured varieties of the wild dog, but they are nearly exterminated.

The history of the

WILD DOG OF AFRICA

will occupy little space. It has already been stated that in Egypt and in Nubia we have the first records of the dog. Many superstitious notions were connected with him, and divine honours were paid to him. Those times are passed away, and he is regarded with aversion by the Moslem of the present day. He is an outcast. He obtains a scanty living by the offal which he gathers in the towns, or he is become a perfect wild dog, and scours the country for his prey. His modern name is the *deab*. He is of considerable size, with a round muzzle, large head, small erect ears, and long and hairy tail, spotted with black, white, and yellow, and having a fierce wolfish aspect. These dogs are not, however, numerous; but the mischief which they do is often great, whether in pairs they burrow in the earth, or associate with others and hunt in troops.*

In Nubia is a smaller dog of the same kind, which never burrows. It lives on small animals and birds, and rarely enters any of the towns. A similar dog, according to Colonel Hamilton Smith, inhabits the neighbourhood of the Cape, and particularly the Karroo or Wilderness. It is smaller than either of the others, and lives among bushes or under prominent rocks. Others, although not identified with the jackal, yet associating with him, inhabit the uplands of Gambia and Senegal.

On the Gold Coast, the dog is used and prized as an article of food. He is fattened and driven to market as the European drives his sheep and hogs. The dog is even more valued than the sheep for human subsistence, and is deemed the greatest luxury that can be placed even on the royal table.

In Loango, or Lower Guinea, is a town from which the African wild dogs derive their name—the *dingo*. They hunt in large packs. They fearlessly attack even the elephant, and generally destroy him. In the neighbourhood of the Cape the country is nearly cleared of wild beasts; but in Cape Town there are a great number of lean and miserable dogs, who howl about the streets at night, quitting their dens and lurking-places in quest of

* Poirer, in his Travels in Barbary, asserts that "the dog loses in the East a great part of those good qualities that make him the friend of man. He is no longer a faithful domesticated animal, faithfully attached to his master, and ever ready to defend him even at the expense of his own life. He is cruel and blood-thirsty, his look is savage, and his appearance revolting; carrion, filth, anything is good enough for him if he can but appease his hunger. They seldom bite one another, but they unite against a stranger who approaches the Arab tents, and would tear him to pieces if he did not seek his safety in flight."—Vol. i., p. 353.

Denon, when in the city of Alexandria, in Egypt, says, "I have no longer recognised the dog, that friend of man, the attached and faithful companion—the lively and honest courtier. He is here a gloomy egotist, and cut off from all human intercourse without being the less a slave. He does not know him whose house he protects, and devours his corpse without repugnance."—Travels in Lower Egypt, p. 32.

offal. No great while ago the wolves and hyænas used to descend and dispute the spoil with the dogs, while the town resounded with their hideous howlings all the night long.

This will be a proper place to refer to the numerous accounts that are given, both in ancient and modern times, of the immolation of dogs, and of their being used for food. They were sacrificed at certain periods by the Greeks and Romans to almost all their deities, and particularly to Mars, Pluto, and Pan, to Minerva, Proserpine, and Lucina, and also to the moon, because the dog by his barking disturbed all charms and spells, and frightened away all spectres and apparitions. The Greeks immolated many dogs in honour of Hecate, because by their baying the phantoms of the lower world were disturbed. A great number of dogs were also destroyed in Samothrace in honour of the same goddess. Dogs were periodically sacrificed in February, and also in April and in May, also to the goddess Rubigo, who presided over the corn, and the Bona Dea, whose mysterious rites were performed on Mount Aventine. The dog Cerberus was supposed to be watching at the feet of Pluto, and a dog and a youth were periodically sacrificed to that deity. The night when the Capitol had nearly been destroyed was annually celebrated by the cruel scourging of a dog in the principal public places, even to the death of the animal.

Many of the Greek and Roman epicures were strangely fond of the flesh of the dog, and those who ought to have known much better encouraged the use of this food. Galen speaks of it in the strongest terms of praise. Hippocrates says that the meat of old dogs is of a warm and dry quality, giving strength to the eater. Ananias the poet speaks of dog's flesh served up with that of the hare and fox. Virgil recommends that the fatted dog should be served up with whey or butter, and Dioscorides the physician says that they should be fed on the whey that remains after the making of cheese.

Before Christianity was established among the Danes, on every ninth year at the winter solstice, a monstrous sacrifice of 99 dogs was effected. In Sweden the sacrifice was still worse. On each of nine successive days 99 dogs were destroyed. This sacrifice of the dog, however, gave way to one as numerous and as horrible. On every ninth year 99 human victims were immolated, and the sons of the reigning tyrant among the rest, in order that the life of the monarch might be prolonged.*

On the other hand, the dog was frequently the executioner; and, from an early period, whether in the course of war or the mock administration of

justice, thousands of poor wretches were torn to pieces by animals trained to that horrible purpose.

Many of the Indians of North America, and almost of the present day, are fond of the flesh of the dog.

Captain Carver, in his *Travels in North America*, in 1766, 1767, and 1768, describes the admission of an Indian into one of the horrible societies of that country. "The dishes being brought near to me," says he, "I perceived that they consisted of dog's flesh, and I was informed that at all their grand feasts they never made use of any other food. The new candidate provides fat dogs for the festival, if they can be procured at any price. They ate the flesh; but the head and the tongue were left sticking on a pole with the front towards the east. When any noxious disease appeared among them, a dog was killed, the intestines were wound between two poles, and ever man was compelled to pass between them."

The Nadowepia Indians also eat dog's flesh as an article of luxury, and not from any want or scarcity of other animal food; for they have the bear, buffalo, elk, deer, beaver, and racoon.

Professor Keating, in his interesting work on the expedition to Peter's River, states that he and a party of American officers were regaled in a large pavilion on buffalo meat, and *tepsia*, a vegetable boiled in buffalo grease, and the flesh of three dogs kept for the occasion, and without any salt. They partook of the flesh of the dogs with a mixture of curiosity and reluctance, and found it to be remarkably fat, sweet, and palatable, divested of any strong taste, and resembling the finest Welsh mutton, but of a darker colour. So strongly rooted, however, are the prejudices of education that few of them could be induced to eat much of it.

The feast being over, great care was taken to replace the bones in their proper places in the dish, after which they were carefully washed and buried, as a token of respect to the animals generally, and because there was the belief among them that at some future time they would return again to life. Well-fattened puppies are frequently sold; and an invitation to a feast of dog's meat is the greatest distinction that can be offered to a stranger by any of the Indian nations east of the Rocky Mountains.

As a counterpart to much of this, the ancient Hyrcanians may be mentioned, who lived near the Caspian Sea, and who deemed it one of the strongest expressions of respect to leave the corpse of their deceased friends to be torn and devoured by dogs. Every man was provided with a certain number of these animals, as a living tomb for himself at some future period, and these dogs were remarkable for their fierceness.

* *Histoire du Chien*, p. 200. *The Voyage of Dumont d'Urville*, vol. ii., p. 474.

DOMESTICATED DOGS OF THE FIRST DIVISION.



THE HARE INDIAN DOG.

Some of the readers of this work may possibly recollect three beautiful dogs of this species in the gardens of the Zoological Society of London, which afforded a perfect illustration of the elongated head of the dogs belonging to Cuvier's first section. Mr. Bennett, the Secretary of the Society, gave an interesting account of them in 1835, derived from the observation of Sir John Franklin and Dr. Richardson.

The elongation and sharpness of the muzzle, and the small capacity of the skull, first attract attention. The dog was doubtless fitted for its situation, where its duty is to hunt by sight, after the moose or rein-deer, but would have been comparatively worthless if he was to be guided by the scent. Its erect ears, widened at the base and pointed at the top, gave it an appearance of vivacity and spirit. Its depth of chest, and tucked-up flank, and muscular quarters, marked it as a dog of speed, while its light frame, and the length of the toes, and wideness of web between them, seem to depict the kind of surface over which it was to bound. It is not designed to seize and to hold any animal of considerable bulk; it bounds over the snow without sinking, if the slightest crust is formed upon it, and eagerly overtakes and keeps at bay the moose or the rein-deer until the hunters arrive. This animal furnishes a beautiful illustration of adaptation for a particular purpose.

The hair of these dogs is white, with patches of grayish-black and brown. They are known only in the neighbourhood of the Mackenzie River, and of the Great Bear Lake in North America. They appear to be good-tempered and easily

manageable, and soon become familiar even with strangers. They are most valuable to the Indians, who live almost entirely on the produce of the chase. In their native country they never bark, but utter a whine and howl resembling that of the Esquimaux dog; yet one of the three, who was born a few days after its parents arrived at the gardens, while it whined and howled occasionally with its parents, at other times uttered the perfect bark of its companions of various breeds around it.

THE ALBANIAN DOG

can be traced to a very remote period of history. Some of the old authors speak of it as the dog which, in the times of ancient mythology, Diana presented to Procris. Pliny describes in enthusiastic terms the combat of one of them with a lion, and afterwards with an elephant. A dog very much resembling the ancient stories is yet found in Albania, and most of the districts of Greece. He is almost as large as a mastiff, with long and silky hair, the legs being shorter and stronger than those of the greyhound. He is gentle and tractable with those whom he knows, and when there is no point of duty at stake; but no bribe can seduce him from his post when any trust is committed to him.

THE GREAT DANISH DOG, CALLED ALSO THE DALMATIAN OR SPOTTED DOG.

The difference between these two breeds consists principally in the size, the Dalmatian being much smaller than the Danish. The body is generally white, marked with numerous small



THE GREAT DANISH DOG.

round black or reddish-brown spots. The Dalmatian is said to be used in his native country for the chace, to be easily broken, and stanch to his work. He has never been thus employed in England, but is chiefly distinguished by his fondness for horses, and as being the frequent attendant on the carriages of the wealthy. To that its office seems to be confined; for it rarely develops sufficient sense or sagacity to be useful in any of the ordinary offices of the dog.

THE FRENCH MATIN

(*Canis lanarius*). There is considerable difficulty in describing this variety. The French consider it as the progenitor of all the breeds of dogs that resemble and yet cannot be perfectly classed with the greyhound. It should rather be considered as a species in which are included a variety of dogs—the Albanian, the Danish, the Irish greyhound, and almost the pure British greyhound. The head is elongated and the forehead flat, the ears pendulous towards the tips, and the colour of a yellowish fawn. This is the usual sheep-dog in France, in which country he is also employed as a house-dog. He discharges his duty most faithfully; and, notwithstanding his flat forehead, shows himself to possess a very high degree of intelligence.

THE GREYHOUND.

We find no mention of this dog in the early Grecian records. The *pugnaces* and the *sagaces* are mentioned; but the *celeres*—the swift-footed—are not spoken of as a peculiar breed. The Celtic nations, the inhabitants of the northern continent of Europe and the Western Islands, were then scarcely known, and the swift-footed dogs were peculiar to those tribes. They were not, however, introduced into the more southern parts of Europe until after the dissolution of the Roman commonwealth.

The dog is, however, mentioned by Ovid; and his description of coursing the hare is so accurate that we cannot refrain from inserting it. We select a translation of it from Golding.

“ I gat me to the knap
Of this same hill, and there behelde of this strange course the hap,
In which the beaste seemes one while caught, and ere a man would
thinke
Doth quickly give the grewnd* the slip, and from his biting
shrinke;
And, like a willie fox, he runs not forth directly out,
Nor makes a winlas over all the champion fields about,
But, doubling and indenting, still avoydes his enemy's lips,
An turning short, as swift about as spinning wheele he wips,
To disappoint the snatch. The grewnd, pursuing at an inch,
Doth cote† him, never loosing. Continually he snatches
In vaine, but nothing in his mouth, save only hair, he catches.”

There is another sketch by the same poet:

* Greyhound.

† Overcast, or overrun.



THE GREYHOUND.

"As when th' impatient greyhound, slipped from far,
Bounds o'er the glade to course the fearful hare,
She in her speed does all her safety lay,
And he with double speed pursues the prey;
O'erruns her at the sitting turn, but licks
His chaps in vain, yet blows upon the flix;
She seeks the shelter, which the neighbouring covert gives,
And, gaining it, she doubts if yet she lives."*

The English, Scotch, and Irish greyhound were all of Celtic derivation, and their cultivation and character corresponded with the civilization of the different Celtic tribes. The dogs that were exported from Britain to Rome were probably of this kind. Mr. Blaine gives an account of the progress of these dogs, which seems to be evidently founded on truth. "Scotland, a northern locality, has long been celebrated for its greyhounds, which are known to be large and wiry-coated. They are probably types of the early Celtic greyhounds, which, yielding to the influences of a colder climate than that they came from, became coated with a thick and wiry hair. In Ireland, as being milder in its climate, the frame expanded in bulk, and the coat, although not altogether, was yet less crisped and wiry. In both localities, there being at that time boars, wolves, and even bears, powerful dogs were required. In England these wild beasts were more early exterminated, and consequently the same kind of dog

was not retained, but, on the contrary, was by culture made finer in coat, and of greater beauty in form."

Mr. Richardson, in his *History of the Greyhound*, gives a different derivation of the name of this dog. He says that the greyhound was of Grecian origin—*canis Græcus*—that *Græcus* was not unfrequently written *Græius*, and thence was derived the term *greyhound*. This derivation, however, is somewhat too far-fetched.

Mention occurs of the greyhound in a very early period of the British history. He was an inmate of the Anglo-Saxon kennels in the time of Elfric, king of Mercia. There are paintings of him that can be satisfactorily traced to the ninth century. In the time of Canute he was reckoned first in degree of rank among the canine species, and no one under the degree of a gentleman, *liberalis*, or more properly perhaps a *freeholder*, was allowed by the forest laws to keep them. Even he could not keep them within two miles of a royal forest, unless two of the toes were cut off, and for every mile that an uncut dog was found within this distance, a fine of a shilling was levied on the owner. The nobleman was rarely seen abroad without his hawk upon his fist, and his greyhound at his side.

Henry II. was passionately fond of them. John spared no expense to procure good horses and swift hounds, and appears frequently to have

* Ovid, *Metamorph.*, lib. i., v. 353.

received greyhounds in lieu of money on the issue or renewal of grants. For the renewal of a grant in the year 1203 he received five hundred marks, ten horses, and ten leashes of greyhounds; and for another, in 1210, one swift running horse and six greyhounds.

The Isle of Dogs, now devoted to purposes of commerce, derived its name from its having been, at this period, the receptacle of the greyhounds and spaniels of this monarch. It was selected on account of its contiguity to Waltham and the other royal forests where coursing was a frequent amusement. For the same purpose he often took up his abode at Greenwich.*

Blount's Ancient Tenures abound with instances of the high repute in which this dog has ever been held in Great Britain. The holders of land in the manor of Setene in Kent were compelled, as the condition of their tenure to Edward I. and II., to lend their greyhounds, when this king went into Gascony, "so long as a pair of shoes of 4d. price would last." Edward III. was partial to greyhounds; for when he was engaged in war with France, he took with him sixty couples of them, besides other large hunting dogs.

Charles I. was as fond of the greyhound as his son Charles II. was of the spaniel. Sir Philip Warwick thus writes of that unfortunate monarch: "Methinks, because it shows his dislike of a common court vice, it is not unworthy the relating of him, that one evening, his dog scratching at his door, he commanded me to let in Gipsy; whereupon I took the boldness to say, Sir, I perceive you love a greyhound better than you do a spaniel. Yes, says he, for they equally love their masters, and yet do not flatter them so much."

On most of the old tombs in the sculpture of which the dog is introduced, the greyhound is represented lying at the feet of his master; and an old Welsh proverb says that a gentleman may be known by his hawk, his horse, and his greyhound.

The following poetical record of the fidelity,

* A singular story is told of Richard II. and one of these dogs. It is given in the language of Froissart. "A grayhounde called Mithe, who always wayted upon the kyng, and woulde knowe no man els. For when so ever the kyng did ryde, he that kept the grayhounde dyd lette him lose, and he wolde streight runne to the kyng and faune upon hym, and leape with his fore fete upon the kyng's shoulders. And, as the kyng and the Erle of Derby talked togyder in the courte, the grayhounde, who was wonte to leape upon the kyng, left the kyng and came to the Erle of Derby, Duke of Lancastre, and made to him the same friendly countenance and chere as he was wonte to do to the kyng. The duke, who knew not the grayhounde, demanded of the kyng what the grayhounde wolde do? 'Cousin,' quod the kyng, 'it is a greate goode token to you, and an evyl signe to me.' 'How knowe you that?' quod the duke. 'I knowe it well,' quod the kyng. 'The grayhounde acknowledgeth you here this daye as Kyng of England, as ye shal be, and I shal be deposed; the grayhounde hath this knowledge naturally: therefore take hym to you, he wyll followe you and forsake me.' The duke understood well those words, and cheryshed the grayhounde, who wolde never after followe kynge Richarde, but followed the Duke of Lancastre."

prowess, and ill-fate of Gélert, the favourite greyhound of Llewellyn Prince of Wales, and son-in-law to King John, will be read with interest:—

The spearman heard the bugle sound
And cheerly smiled the morn,
And many a brach and many a hound
Obeyed Llewellyn's horn.

And still he blew a louder blast,
And gave a louder cheer,
"Come, Gélert! why art thou the last
Llewellyn's horn to hear?"

"Oh, where does faithful Gélert roam,
The flower of all his race!
So true, so brave; a lamb at home,
A lion in the chace?"

"T was only at Llewellyn's board
The faithful Gélert fed,
He watched, he served, he cheered his lord,
And sentinel'd his bed.

In sooth he was a peerless hound,
The gift of royal John;
But now no Gélert could be found,
And all the chace rode on.

And now as over rocks and dells
The gallant chidings rise,
All Snowdon's craggy chaos yells
With many mingled cries.

That day Llewellyn little loved
The chace of hart or hare,
And scant and small the booty proved,
For Gélert was not there.

Unpleased Llewellyn homeward hied;
When near the portal seat
His truant Gélert he espied,
Bounding his lord to greet.

But when he gained the castle-door,
Aghast the chieftain stood;
The hound was smeared with gouts of gore,
His lips and fangs ran blood.

Llewellyn gazed with wild surprise:
Unused such looks to meet,
His favourite cheek'd his joyful guise,
And crouched and licked his feet.

Onward in haste Llewellyn pass'd,
And on went Gélert too;
And still, where'er his eyes he cast,
Fresh blood-gouts shocked his view.

O'returned his infant's bed he found,
The blood-stained covert rent;
And all around the walls and ground
With recent blood besprent.

He called his child—no voice replied—
He searched with terror wild:
Blood! blood! he found on every side,
But nowhere found the child.

"Hellhound! by thee my child's devoured!"
The frantic father cried;
And to the hilt his vengeful sword
He plunged in Gélert's side.

His suppliant, as to earth he fell,
No pity could impart;
But still his Gélert's dying yell
Passed heavy o'er his heart.

Aroused by Gélert's dying yell,
Some slumberer awakened nigh:—
What words the parent's joy can tell
To hear his infant cry!

Concealed beneath a mangled heap
His hurried search had missed,
All glowing from his rosy sleep,
His cherub boy he kissed.

Nor scratch had he, nor harm, nor dread,
But the same couch beneath
Lay a great wolf, all torn and dead,
Tremendous still in death.

Ah, what was then Llewellyn's pain!
For now the truth was clear;
The gallant hound the wolf had slain,
To save Llewellyn's heir.

Vain, vain was all Llewellyn's wo;
"Best of thy kind, adieu!
The frantic deed which laid thee low
This heart shall ever rue."

And now a gallant tomb they raise,
With costly sculpture decked;
And marbles, storied with his praise,
Poor Gélert's bones protect.

Here never could the spearman pass,
Or forester, unmoved;
Here oft the tear-besprinkled grass
Llewellyn's sorrow proved.

And here he hung his horn and spear,
And oft, as evening fell,
In fancy's piercing sounds would hear
Poor Gélert's dying yell!

It will be evident, however, from the story of the noble hound whose history is just related, that the greyhounds of the time were very different from those which are used at the present day. There are no Gélerts now to combat successfully with the wolf, if these ferocious animals were yet to be met with in our forests. The greyhound of this early period must have resembled the Irish wolf-dog of the present day, a larger, stronger, fiercer dog than we are accustomed to see.

The owner of Gélert lived in the time of John, in the early part of the thirteenth century; but, at the latter part of the fifteenth century, the following singular description is given of the greyhound of that period. It is extracted from a very curious work entitled "The Treatise per teynynge to Hawkyng, Huntynge, &c., emprinted at Westmestre, by Wynkyn de Worde, 1496."

A greyhounde should be headed lyke a snake,
And neckyd lyke a drake,
Fotyd like a cat,
Tayled like a ratte,
Syded like a teme,
And chyned like a bream.
The fyrste yere he must learne to fede,
The seconde yere to feld him lede.
The thyrd yere he is felow lyke.
The fourth yere there is none syke.
The fith yere he is good ynough.
The syxth yere he shall hold the plough
The seventh year he will avaylle
Grete bytches for assaile.
But when he is come to the ninth yere,
Have him then to the tannere;
For the best hound that ever bytch had
At the ninth yere is full bad.

As to the destiny of the poor animal in his ninth year, we differ from the author; but it

cannot be denied that few dogs retain their speed beyond the eighth or ninth year.

There can scarcely be a better description of the greyhound of the present day, but it would not do for the antagonist of the wolf. The breed had probably begun to degenerate, and that process would seem to have slowly progressed. Towards the close of the last century Lord Orford, a nobleman enthusiastically devoted to coursing, imagined, and rightly, that the greyhound of his day was deficient in courage and perseverance. He bethought himself how this could best be rectified, and he adopted a plan which brought upon him much ridicule at the time, but ultimately redounded to his credit. He selected a bull-dog, one of the smooth, rat-tailed species, and he crossed one of his greyhound bitches with him. He kept the female whelps, and crossed them with some of his fleetest dogs, and the consequence was, that, after the sixth or seventh generation, there was not a vestige left of the form of the bull-dog, but his courage and his indomitable perseverance remained, and, having once started after his game, he did not relinquish chace until he fell exhausted, or perhaps died. This cross is now almost universally adopted. It is one of the secrets in the breeding of the greyhound.

Of the stanchness of the well-bred greyhound the following is a satisfactory example. A hare was started before a brace of greyhounds, and ran by them for several miles. When they were found, both the dogs and the hare lay dead within a few yards of each other. A labouring man had seen them turn her several times, but it did not appear that either of them had caught her, for there was no wound upon her.

A favourite bitch of this breed was Czarina, bred by Lord Orford, and purchased at his decease by Colonel Thornton. She won every match for which she started, and they were no fewer than forty-seven. Lord Orford had matched her for a stake of considerable magnitude; but, before the appointed day arrived he became seriously ill, and was confined to his chamber. On the morning of the course he eluded the watchfulness of his attendant, saddled his favourite piebald poney, and, at the moment of starting, appeared on the course. No one had power to restrain him, and all entreaties were vain. He peremptorily insisted on the dogs being started, and he would ride after them. His favourite bitch displayed her superiority at every stroke; she won the stakes: but at the moment of highest exultation he fell from his poney, and, pitching on his head, almost immediately expired. With all his eccentricities, he was a kind, benevolent, and honourable man.

In the thirteenth year of her age, and in defiance of the strange verses just now quoted, Czarina began to breed, and two of her progeny,

Claret and young Czarina, challenged the whole kingdom, and won their matches. Major, and Snowball, without a white spot about him, inherited all the excellence of their dam. The former was rather the fleetest of the two, but the stanchness of Snowball nothing could exceed. A Scotch greyhound, who had beaten every opponent in his own country, was at this time brought to England, and challenged every dog in the kingdom. The challenge was accepted by Snowball, who beat him in a two-mile course. Snowball won the Malton cup on four successive years, was never beaten, and some of his blood is now to be traced in almost every good dog in every part of the kingdom, at least in all those that are accustomed to hunt in an open country. The last match run by Snowball was against Mr. Plumber's celebrated greyhound Speed; and, so severely contested was it, that Speed died soon afterwards. A son of the old dog, called Young Snowball, who almost equalled his father, was sold for one hundred guineas.

The speed of the greyhound has been said to be equal to that of the fleetest horse. A singular circumstance, which occurred at Doncaster, proved that it was not much inferior. A mare cantering over the Doncaster course, her competitor having been withdrawn, was joined by a greyhound bitch when she had proceeded about a mile. She seemed determined to race with the mare, which the jockey humoured, and gradually increased his pace, until at the distance they put themselves at their full speed. The mare beat her antagonist only by a head. The race-horse is, perhaps, generally superior to the greyhound on level ground, but the greyhound would have the advantage in a hilly country.

Lord Rivers succeeded to Major Topham and Colonel Thornton, the owners of Major and Snowball, as the leading man on the course. His kennels at Strathfieldsaye were the pride of the neighbouring country. At first he bore away almost every prize, but breeding too much in and in, and for speed more than for stoutness, the reputation of his kennel considerably declined before his death.

In 1797 a brace of greyhounds coursed a hare over the edge of a chalk-pit at Offham, in Sussex. The hare and both the dogs were found dead at the bottom of the pit.

On another occasion a hare was chased by a brace of greyhounds: she was killed at the distance of seven miles from the place at which they started. Both of the dogs were so exhausted, that, every possible assistance being given, they were with difficulty recovered.

The English greyhound hunts by sight alone; not because he is altogether devoid of scent, but because he has been taught to depend upon his speed, and that degree of speed which is utterly

incompatible with the searching out of the scent. It is like a pack of hounds, running breast high, with the game in view. They are then running by sight, and not by scent, almost doubling their usual pace, and sometimes, from an unexpected turning of the fox or hare, thrown out for a little while. The hound soon recovers the track by his exquisite sense of smell. The English greyhound is never taught to scent his game, but, on the contrary, is called off the moment he has lost sight of the hare, the re-starting of which is left to the spaniel.

The English greyhound is distinguished by its peculiarly long and attenuated head and face, terminating in a singular sharpness of the nose, and length of the muzzle or mouth. There are two results from this: the length of the mouth gives a longer grasp and secures the prey, but, as the nasal cavities and the cavity of the skull are proportionately diminished, there is not so much room for the expansion of the membrane of the nose, there is less power of scent, and less space for the development of the brain.

There is little want of extraordinary acute hearing, and the ears of the greyhound are small compared with his bulk. Markham recommends the ears to be close, sharp, and drooping, neither protruding by their bulk, not tiring by their weight.

The power of the eye is but of little consequence, for the game is rarely distant from the dog, and, therefore, easily seen.

The neck is an important portion of the frame. It should be long, in order to correspond with the length of the legs, and thus enable the dog to seize and lift the game, as he rapidly pursues his course, without throwing any undue or dangerous weight on the fore extremities. In the act of seizing the hare the short-necked dog may lose the centre of gravity and fall.

The chest is a very important part of the greyhound, as well as of every other animal of speed. It must be capacious: this capacity must be obtained by depth rather than by width, in order that the shoulders may not be thrown so far apart as to impede progression.

The form and situation of the shoulders are of material consequence; for on them depends the extent of the action which the animal is capable of exerting. The shoulders should be broad and deep, and obliquely placed. They are so in the horse, and the action of the dog depends entirely on this conformation.

The fore-legs should be set on square at the shoulder: bulging out at the elbow not only gives a clumsy appearance, but makes the dog slow. The legs should have plenty of bone, and be straight, and well set on the feet, and the toes neither turned out nor in. The fore-arm, or that portion of the leg which is between the elbow and

the knee, should be long, straight, and muscular. These are circumstances that cannot be dispensed with. The length of the fore-arm, and the low placing of the pastern, are of essential importance.

With regard to the form of the back and sides of the greyhound, Mr. Thacker says, with much truth, that "It is the strength of the back which is brought into requisition, in particular, in running over hilly ground. Here may be said to rest the distinction between long and short backs, supposing both to be good and strong. The more lengthy the back, and proportionately strong, the more the greyhound is calculated to beat the shorter-backed dog on the flat; but on hilly ground one with a shorter back will have the advantage."*

The ribs should also be well arched. We would perhaps avoid him with sides too decidedly outswelling, but still more would we avoid the direct flat-sided dog.

Without really good haunches and muscular thighs, it has been well remarked that the odds are against any dog, be his other points whatever they may. It is by the propulsatory efforts of the muscles of the loins and thighs that the race is won. The thighs should be large and muscularly indented; the hocks broad, and, like the knee, low placed. These are very important points; for, as Mr. Blaine has properly remarked, "on the extent of the angles formed between these several portions of the hinder limbs, depends the extent of the space passed over at each bound."

The colour of the greyhound varies exceedingly. Some are perfectly black and glossy. In strength and endurance the brindled dog, or the brown or fawn-coloured one, is the best. The white greyhound, although a beautiful animal and swift, is not, perhaps, quite so much to be depended on.

The greyhound is said to be deficient in attachment to his master and in general intelligence. There is some truth in the imputation; but, in fact, the greyhound has, far less than even the hound, the opportunity of forming individual attachments, and no other exercise of the mind is required of him than to follow the game which starts up before him, and to catch it if he can. If, however, he is closely watched he will be found to have all the intellect that his situation requires.†

As to the individual attachment which the greyhound may form, he has not always or often the opportunity to acquire or to exhibit it. The

keeper exercises over him a tyrannical power, and the owner seldom notices him in the manner which excites affection, or scarcely recognition; but, as a plea for the seeming want of fondness, which, compared with other breeds, he exhibits, it will be sufficient to quote the testimony of the younger Xenophon, who had made the greyhound his companion and his friend.

"I have myself bred up," says he, "a swift, hard-working, courageous, sound-footed dog. He is most gentle and kindly affectioned, and never before had I any such a dog for myself, or my friend, or my fellow-sportsman. When he is not actually engaged in coursing he is never away from me. On his return he runs before me, often looking back to see whether I had turned out of the road, and as soon as he again catches sight of me, showing symptoms of joy, and once more trotting away before me. If a short time only has passed since he has seen me or my friend, he jumps up repeatedly by way of salutation, and barks with joy as a greeting to us. He has also many different tones of speech, and such as I never heard from any other dog. Now really I do not think that I ought to be ashamed to chronicle the name of this dog, or to let posterity know that Xenophon the Athenian had a greyhound, called *Homé*, possessed of the greatest speed, and intelligence, and fidelity, and excellent in every point."

The greyhound has within the last fifty years assumed a somewhat different character from that which he once possessed. He is distinguished by a beautiful symmetry of form, of which he once could not boast, and he has even superior speed to that which he formerly exhibited. He is no longer used to struggle with the deer, but he contends with his fellow over a shorter and speedier course.

The rules for breeding and breaking-in of greyhounds are very simple. The utmost attention should be paid to the qualities of the parents; for it is as certain in these dogs as in the horse that all depends upon the breeding. The bitch should be healthy and of good size; the dog muscular, stanch, and speedy, and somewhat larger than the bitch. Both should have arrived at their full vigour, and with none of their powers beginning to fail. Those as much as possible should be selected whose peculiar appearance bids fair to increase the good qualities and diminish the bad ones on either side. The best blood and the best

ere they discovered that they could gnaw the cords asunder, and displace the rod, and fish out the meat as before. Small chains were then substituted for the cords, and the meat was cooked in safety for nearly a week, when they found that, by rearing themselves on their hind legs, and applying their united strength towards the top of the boiler, they could lift it out of its bed and roll it along the floor, and so get at the broth, although the meat was out of their reach. The man who looked after them expressed himself heartily glad when they were gone; for he said he was often afraid to go into the kennel, and was sure they were devils, and not dogs.

* Thacker on Sporting.

† The writer of this work had a brace of greyhounds as arrant thieves as ever lived. They would now and then steal into the cooking-room belonging to the kennel, lift the lid from the boiler, and, if any portion of the joint or piece of meat projected above the water, suddenly seize it, and before there was time for them to feel much of its heat, contrive to whirl it on the floor, and eat it at their leisure as it got cold. In order to prevent this, the top of the boiler was secured by an iron rod passing under its handle, and tied to the handle of the boiler on each side; but not many days passed

form should be diligently sought. Breeding from young dogs on either side should, generally speaking, be avoided. With regard to older dogs, whether male or female, there may be less care. Many greyhounds, both male and female, eight, nine, and ten years of age, have been the progenitors of dogs possessing every stanch and good quality.

On no consideration, however, should the bitch be put to the dog before she is two years old. Little can be done to regulate the period of œstrum; but the most valuable breed will be almost invariably that which is produced during the spring, because at that time there will often be opportunity for that systematic exercise on which the growth and powers of the dog so materially depend. A litter of puppies in the beginning or even the middle of winter will often be scarcely worth the trouble or expense of rearing.

The age of the greyhound is now taken from the first day in the year; but the conditions of entry are fixed at different periods. It seems, however, to be agreed that no dog or bitch can qualify for a puppy cup after two years of age.

One principle to be ever kept in mind is a warm and comfortable situation, and a plentiful supply of nourishment for the mother and for the puppies from the moment of their birth. The dog that is stunted in his early growth will never do its owner credit. The bitch should be abundantly supplied with milk, and the young ones with milk and bread, and oatmeal, and small portions of flesh as soon as they are disposed to eat it; great care, however, being taken that they are not over-gorged. Regular and proper feeding, with occasional exercise, will constitute the best preparation for the actual training. If a foster-mother be required for the puppies, it should, if possible, be a greyhound; for it is not at all impossible that the bad qualities of the nurse may, to a greater or less degree, be communicated to the whelps. Bringing up by hand is far preferable to the introduction of any foster-mother. A glass or India-rubber bottle may be used for a little while, if not until the weaning. Milk at first, and afterwards milk and sop alternately, may be used.

There is a difference of opinion whether the whelp should be kept in the kennel and subjected to its regular discipline, or placed at walk in some farm-house. In consequence of the liberty he will enjoy at the latter, his growth will probably be more rapid; but, running with the farmers' dogs, and probably coursing many hares, he will acquire, to a certain degree, a habit of wildness. It is useless to deny this; but, on the other hand, nothing will contribute so much to the development of every power as a state of almost unlimited freedom when the dogs are young. The wildness that will be exhibited can soon be afterwards

restrained so far as is necessary, and the dog who has been permitted to exert his powers when young will manifest his superiority in more advanced age, and in nothing more than his dexterity at the turn.

When the training actually commences, it should be preceded by a couple of doses of physic, with an interval of five or six days, and, probably, a moderate bleeding between them; for, if the dog begins to work overloaded with flesh and fat, he will suffer so severely from it that possibly he will never afterwards prove a game dog. In the course of his training he should be allowed every advantage, and experience every encouragement. His courses should be twice or thrice a-week, according to their severity, and as often as it can be effected he should be rewarded with some mark of kindness.

In the Sportsman for April, 1840, is an interesting account of the chase of the hare. It is said that, in general, a good greyhound will reach a hare if she runs straight. He pursues her eagerly, and the moment he is about to strike at her she turns short, and the dog, unable to stop himself, is thrown from ten to twenty yards from her. These jerking turns soon begin to tell upon a dog, and an old well-practised hare will seldom fail to make her escape. When, however, pursued by a couple of dogs, the hare has a more difficult game to play, as it frequently happens that when she is turned by the leading dog she has great difficulty in avoiding the stroke of the second.

It is highly interesting to witness the game of an old hare. She has generally some brake or thicket in view, under the cover of which she means to escape from her pursuers. On moving from her seat she makes directly for the hiding place, but, unable to reach it, has recourse to turning, and, *wrenched* by one or the other of her pursuers, she seems every moment almost in the jaws of one of them, and yet in a most dexterous manner she accomplishes her object. A greyhound, when he perceives a hare about to enter a thicket, is sure to strike at her if within any reasonable distance. The hare shortens her stride as she approaches the thicket, and at the critical moment she makes so sudden, dexterous, and effectual a spring, that the dogs are flung to a considerable distance, and she has reached the cover and escaped.

The isle of Cyprus has for many years been celebrated for its breed of the greyhound. On grand days, or when the governor is present, the sport is conducted in a curious manner. When the hare is ready to become the prey of its enemies, the governor rushes forwards, and throwing before the greyhounds a stick which he carries, they all instantaneously stop. The hare now runs a little distance; but one of the swiftest greyhounds is

then let loose. He pursues the hare, and, having come up with it, carries it back, and springing on the neck of the governor's horse, places it before him. The governor delivers it to one of his officers, who sends it to the park, where he maintains many prisoners of the same kind; for he will not destroy the animal that has contributed to his amusement.*

The following, according to Mr. Blaine, an ardent courser in his youth, is the best mode of feeding greyhounds at regular work:—"The dogs had a full flesh meal every afternoon or evening, as more nutriment is derived from night-feeding than by day, and when sleeping than when waking. In the morning they were let out, and either followed the keeper about the paddock, or the groom in his horse exercise, and then had a trifling meal of mixed food, as a quieting portion, until the evening full meal. Such was our practice on the days when no coursing was contemplated, and with the exception of lowering the quantity and quality of the evening meal, the same plan was pursued throughout the year. On the day previous to coursing, if we intended anything like an exhibition of our dogs before company engaged to meet us on the marshes, we gave a plentiful meal early the previous day, some exercise also in the afternoon, and a light supper at night of meal with either broth or milk, with a man on horseback going a gentle trot of six or seven miles an hour."†

Mr. Thacker orders the greyhounds out on the fore part of every day; but, instead of being loose and at liberty, they would be much better two and two; then when he meets with a proper field to loose them in, to give them a good gallop. This will be a greater novelty than if they had been loose on the road, and they will gallop with more eagerness. Four days in a week will be enough for this exercise. On one day there should be a gallop of one or two miles, or even a course for each brace of dogs.

The young dog has usually an older and more experienced one to start with him. That which is of most importance is, that his leader should be a thoroughly stout and high-mettled dog. If he shrinks or shies at any impediment, however formidable, the young one will be sure to imitate him, and to become an uncertain dog, if not a rank coward. Early in November is the time when these initiatory trials are to be made. It is of consequence that the young one should witness a death as soon as possible. Some imagine that two old dogs should accompany the young one at its first commencement. After the death of the leveret, the young dog must be coaxed and fondled, but never suffered to taste the blood.

In kennels in which the training is regularly conducted, the dog should be brushed all over twice every day. Few things contribute so much to health as general cleanliness, and friction applied to the skin. Warmth is as necessary for greyhounds as for horses, and should not be forgotten in cold weather. Body-clothing is a custom of considerable antiquity, and should not be abandoned. The breeder of greyhounds for the purpose of coursing must reckon upon incurring considerable expense; but, if he loves the sport, he will be amply remunerated by the speed and stoutness of his dogs.

A question has arisen whether, on the morning of the coursing, any stimulant should be given to the dog. The author of this work would unhesitatingly approve of this practice. He has had abundant experience of the good effect of it; but the stimulus must be that which, while it produces the desired effect, leaves no exhaustion behind.‡

THE SCOTCH GREYHOUND

has the same sharpness of muzzle, length of head, lightness of ear, and depth of chest, as the English dog; but the general frame is stronger and more muscular, the hind quarters more prominent, there is evident increase of size and roughness of coat, and there is also some diminution of speed. If it were not for these points, these dogs might occasionally be taken for each other. In coursing the hare, no north-country dog will stand against the lighter southern, although the southern would be unequal to the labour often required from the Highlander.

The Scotch greyhound is said, perhaps wrongly, to be oftenest used by those who look more to the quantity of game, than to the fairness and openness of the sport, and in some parts of the country this dog is not permitted to be entered for a sweepstakes, because, instead of depending on his speed alone, as does the English greyhound, he has recourse to occasional artifices in order to intercept the hare. In sporting language he runs sly, and therefore is sometimes excluded.

THE HIGHLAND GREYHOUND OR DEER-HOUND

is a larger, stronger, and fiercer dog, and may be readily distinguished from the Lowland Scotch greyhound, by its pendulous and generally darker ears, and by the length of hair which almost covers his face. Many accounts have been given of the perfection of its scent, and it is said to have followed a wounded deer during two successive days. He is usually two inches taller than the Scotch greyhound. The head is carried particularly high, and gives to the animal a noble appearance. His limbs are exceedingly muscular,

* Scott's Sportsman's Repository, p. 97.

† Blaine's Encyclopedia of Sporting.

‡ For a set of laws for Coursing Matches, see Appendix.

his back beautifully arched. The tail is long and curved, but assumes the form of an almost straight line when he is much excited. The only fault which these dogs have is their occasional ill-temper, or even ferocity; but this does not extend to the owner and his family.

It appears singular that the English greyhound exhibits so little power of scent; but this is simply because he has never been taught to use it, or has been cruelly corrected when he has attempted to exercise it.

Holinshed relates the mischief that followed the stealing of one of these dogs:—"Divers of the young Pictish nobility repaired unto Craith-lint, the King of the Scots, for to hunt and make merie with him; but, when they should depart homewards, perceiving that the Scottish dogs did far excel theirs, both in fairnesse, swiftnesse, and hardnesse, and also in long standing up and holding out, they got diverse both dogs and bitches of the best kind for breed, to be given them by the Scottish Lords; and yet not so contented, they stole one belonging to the King from his keeper, being more esteemed of him than all the others which he had about him. The maister of the leash, being informed hereof, pursued after them that had stolen the dog, thinking, indeed, to have taken him from them; but they not being to part with him fell at altercation, and at the end chanced to strike the maister of the leash through with their horse spears, so that he did die presently. Whereupon noise and crie being raised in the country by his servantes, divers of the Scots, as they were going home from hunting, returned, and falling upon the Picts to revenge the death of their fellow, there ensued a shrewed bickering betwixt them; so that of the Scots there died three score gentlemen, besides a great number of the commons, not one of them understanding what the matter meant. Of the Picts there were about 100 slaine."

Mr. H. D. Richardson describes a cross between the greyhound and British bloodhound:—"It is a tall muscular raw-boned dog, the ears far larger, and more pendulous, than those of the greyhound or deer-hound. The colour is generally black, or black and tan; his muzzle and the tips of the ears usually dark. He is exceedingly swift and fierce; can pull down a stag single-handed; runs chiefly by sight, but will also occasionally take up the scent. In point of scent, however, he is inferior to the true deer-hound. This dog cannot take a turn readily, but often fails at the double."*

THE IRISH GREYHOUND.

This dog differs from the Scotch, in having shorter and finer hair, of a pale fawn colour, and

pendent ears. It is, compared with the Scotch dog, gentle and harmless, perhaps indolent, until roused. It is a larger dog than the Scottish dog, some of them being full four feet in length, and proportionately muscular. On this account, and also on account of their determined spirit when roused, they were carefully preserved by some Irish gentlemen. They were formerly used in hunting the wolf when that animal infested the forests of Ireland. Mr. Bell says that the last person who kept the pure breed was Lord Altamont, who in 1780 had eight of them.†

THE GASEHOUND,

the *agasæus* of former times, was probably allied to, or connected with, the Irish greyhound. It hunted entirely by sight, and, if its prey was lost for a time, it could recover it by a singular distinguishing faculty. Should the deer rejoin the herd, the dog would unerringly select him again from all his companions:—

"Seest thou the gasehound how with glance severe
From the close herd he marks the destined deer?"‡

There is no dog possessed of this quality at present known in Europe; but the translator of Arrian thinks that it might be produced between the Irish greyhound and the bloodhound.

THE IRISH WOLF-DOG.

This animal is nearly extinct, or only to be met with at the mansions of one or two persons, by whom he is kept more for show than use, the wild animals which he seemed powerful enough to conquer having long disappeared from the kingdom. The beauty of his appearance and the antiquity of his race are his only claims, as he disdains the chase of stag, fox, or hare, although he is ever ready to protect the person and the property of his master. His size is various, some having attained the height of four feet; and Dr. Goldsmith states that he saw one as large as a yearling calf. He is shaped like a greyhound, but stouter; and the only dog which the writer from whom this account is taken ever saw approaching to his graceful figure, combining beauty with strength, is the large Spanish wolf-dog: concerning which he adds, that, showing one of these Spanish dogs to some friends, he leaped through a window into a cow-house, where a valuable calf was lying, and seizing the terrified animal, killed it in an instant; some sheep having in the same way disappeared, he was given away. The same writer says that his grandfather had an Irish wolf-dog which saved his mother's life from a wolf as she was paying a visit attended by this faithful follower. He rushed on his foe

* Sportsman, vol. xi. p. 314.

† Bell's British Quadrupeds, p. 241.

‡ Tickell's Miscellanies.

just when he was about to make his spring, and, after a fierce struggle, laid him dead at his mistress's feet. His name was Bran.*

THE RUSSIAN GREYHOUND

is principally distinguished by its dark-brown or iron-grey colour, its short semi-erect ears, its thin lanky body, long but muscular legs, soft thick hair, and the hair of its tail forming a spiral twist or fan (thence called the fan-tailed dog), and as he runs having a very pleasing appearance. He hunts by scent as well as by sight, and therefore small packs of this kind are sometimes kept, against which the wolf, or even the bear, would stand little chance. He is principally used for the chase of the deer or the wolf, but occasionally follows the hare. The deer is the principal object of pursuit, and for this he is far better adapted

than to contend with the ferocious wolf. His principal faults are want of activity and dexterity. He is met with in most parts of Russia, where his breed is carefully preserved by the nobility, with whom coursing is a favourite diversion.

Some dogs of this breed were not long ago introduced into Ireland.

THE GRECIAN GREYHOUND.

The author is glad that he is enabled to present his readers with the portrait of one from the menagerie of the Zoological Society of London. It is the dog whose image is occasionally sculptured on the friezes of some of the ancient Grecian temples, and was doubtless a faithful portrait of one of the dogs which Xenophon the Athenian valued, and was the companion of the heroes of Greece in her ancient glory.



THE GRECIAN GREYHOUND.

The principal difference between the Grecian and the English greyhound is, that the former is not so large, the muzzle is not so pointed, and the limbs are not so finely framed.

THE TURKISH GREYHOUND

is a small-sized hairless dog, or with only a few hairs on his tail. He is never used in the field, and bred only as a spoiled pet, yet not always spoiled, for anecdotes are related of his inviolable

attachment to his owner. One of them belonged to a Turkish Pacha who was destroyed by the bow-string. He would not forsake the corpse, but laid himself down by the body of his murdered master, and presently expired.

THE PERSIAN GREYHOUND

is a beautiful animal. He is more delicately framed than the English breed; the ears are also more pendulous, and feathered almost as much as those of a King Charles's spaniel. Notwithstanding, however, his apparent slenderness and

* Sporting Mag., 1837, p. 156.

delicacy, he yields not in courage, and scarcely in strength, to the British dog. There are few kennels in which he is found in which he is not the master.

In his native country he is not only used for hunting the hare, but the antelope, the wild ass, and even the boar. The antelope is speedier than the greyhound; therefore the hawk is given to him as an ally. The antelope is no sooner started than the hawk is cast off, who, fluttering before the head of the deer, and, sometimes darting his talons into his head, disconcerts him, and enables the greyhound speedily to overtake and master him. The chase, however, in which the Persians chiefly delight, and for which these greyhounds are mostly valued, is that of the *ghoo-khan*, or wild ass. This animal inhabits the mountainous districts of Persia. He is swift, ferocious, and of great endurance, which, together with the nature of the ground, renders this sport exceedingly dangerous. The hunter scarcely gives the animal a fair chance, for relays of greyhounds are placed at various distances in the surrounding country; so that, when those by which the animal is first started are tired, there are others to continue the chase. Such, however, is the speed and endurance of the *ghoo-khan*, that it is seldom fairly run down by the greyhounds, its death being usually achieved by the rifle of some horseman. The Persians evince great skill and courage in this dangerous sport, galloping at full speed, rifle in hand, up and down the most precipitous hills, and across ravines and mountain streams that might well daunt the boldest rider.*

The Persian greyhound, carried to Hindoostan, is not always to be depended upon, but, it is said, is apt to console itself by hunting its own master, or any one else, when the game proves too fleet or escapes into the cover.

THE ITALIAN GREYHOUND

possesses all the symmetry of the English or Persian one on a small scale. So far as beauty can recommend it, and, generally speaking, good-nature, it is deservedly a favourite in the drawing-room; but, like the large greyhound, it is inferior in intelligence. It has no strong individual attachment, but changes it with singular facility. It is not, however, seen to advantage in its petted and degraded state, but has occasionally proved a not unsuccessful courser of the rabbit and the hare, and exhibited no small share of speed and perseverance. In a country, however, the greater part of which is infested with wolves, it cannot be of much service, but exposed to unnecessary danger. It is bred along the coasts of Italy, principally for the purpose of sale to foreigners.

In order to acquire more perfect beauty of form, and more activity also, the English greyhound has received one cross from the Italian, and with decided advantage. The speed and the beauty have been evidently increased, and the courage and stoutness have not been diminished.

It has been said that Frederick the Great of Prussia was very fond of a small Italian greyhound, and used to carry it about with him under his cloak. During the seven years' war he was pursued by a party of Austrian dragoons, and compelled to take shelter, with his favourite, under the dry arch of a bridge. Had the little animal, that was naturally ill-tempered and noisy, once barked, the monarch would have been taken prisoner, and the fate of the campaign and of Prussia decided; but it lay perfectly still, and clung close to its master, as if conscious of their mutual danger. When it died, it was buried in the gardens of the palace at Berlin, and a suitable inscription placed over its grave.

CHAPTER III.

THE VARIETIES OF THE DOG.—SECOND DIVISION.

The head moderately elongated, the parietals not approaching from their insertion, but rather diverging, so as to enlarge the cerebral cavities and the frontal sinuses; consequently giving to these dogs greater power of scent and intelligence. They constitute the most pleasing and valuable division of the Dog.

The Spaniel is evidently the parent of the Newfoundland dog and the setter; while the retriever, the poodle, the Bernardine, the Esquimaux, the Siberian, and the Greenland dogs, the

shepherd and drover's dog, and every variety distinguished for intelligence and fidelity, have more or less of his blood in them.

THE SPANIEL

is probably of Spanish origin, and thence his name. The ears are large and pendent, the tail elevated, the fur of a different length in different parts of the body, but longest about the ears, under the neck, behind the thighs and on the tail, varying in colour, but most commonly white with brown or black patches.

* New Sports. Mag., xiii. 124.



BLENHEIMS AND COCKERS.

There are many varieties of the spaniel. The smallest of the *land* spaniels is

THE COCKER.

It is chiefly used in flushing woodcocks and pheasants in thickets and copses into which the setter, and even the springer, can scarcely enter.

"But if the shady woods my cares employ,
In quest of feathered game my spaniels beat,
Puzzling the entangled copse, and from the brake
Push forth the whirring pheasant."

The cocker is here very useful, although he is occasionally an exceedingly impatient animal. He is apt to whimper and babble as soon as he comes upon the scent of game, and often raises the bird before the sportsman is within reach: but when he is sufficiently broken in not to give tongue until the game rises he is exceedingly valuable. There can scarcely be a prettier object than this little creature, full of activity, and bustling in every direction, with his tail erect, and, the moment he scents the bird, expressing his delight by the quivering of every limb, and the low eager whimpering which the best breaking cannot always subdue. Presently the bird springs, and then he shrieks out his ecstasy, startling even the sportsman with his sharp, shrill, and strangely expressive bark.

The most serious objection to the use of the cocker is the difficulty of teaching him to distinguish his game, and confine himself within bounds; for he will too often flush every thing that comes

within his reach. It is often the practice to attach bells to his collar, that the sportsman may know where he is; but there is an inconvenience connected with this, that the noise of the bells will often disturb and spring the game before the dog comes fairly upon it.

Patience and perseverance, with a due mixture of kindness and correction, will, however, accomplish a great deal in the tuition of the well-bred spaniel. He may at first hunt about after every bird that presents itself, or chase the interdicted game; but if he is immediately called in and rated, or perhaps corrected, but not too severely, he will learn his proper lesson, and will recognise the game to which alone his attention must be directed. The grand secret in breaking in these dogs is mildness mingled with perseverance, the lessons being enforced and practically illustrated by the example of an old and steady dog.

These spaniels will sometimes vie with almost every other species of dog in intelligence, and will not yield to one of them in fidelity. A gentleman in Sussex had an old cocker, that was his constant companion both in the house and the field. If the morning was rainy the dog was perfectly quiet; if it was fine he became restless, and, at the usual time for his master to go out, he would take him by the flap of his coat, and gently pull at it. If the door was opened, he ran immediately to the keeper's lodge, which was at a considerable distance from the house. This was a signal for the other dogs to be brought up, and then he trotted back to announce their approach.

THE KING CHARLES'S SPANIEL,

so called from the fondness of Charles II. for it—who usually had some of them following him, wherever he went—belongs likewise to the cockers. Its form and character are well preserved in one of the paintings of the unfortunate parent of that monarch and his family. The ears deeply fringed and sweeping the ground, the rounder form of the forehead, the larger and moister eye, the longer and silken coat, and the clearness of the tan, and white and black colour, sufficiently distinguish this variety. His beauty and diminutive size have consigned him to the drawing-room or parlour.

Charles the First had a breed of spaniels, very small, with the hair black and curly. The spaniel of the second Charles was of the black and tan breed.

The King Charles's breed of the present day is materially altered for the worse. The muzzle is almost as short, and the forehead as ugly and prominent, as the veriest bull-dog. The eye is increased to double its former size, and has an expression of stupidity with which the character of the dog too accurately corresponds. Still there is the long ear, and the silky coat, and the beautiful colour of the hair, and for these the dealers do not scruple to ask twenty, thirty, and even fifty guineas.

THE SPRINGER.

This dog is slower and steadier in its range than the cocker; but it is a much safer dog for the shooter, and can better stand a hard day's work. The largest and best breed of springers is said to be in Sussex, and is much esteemed in the Wealds of that county.

From a cross with the terrier, a black and tan variety was procured, which was cultivated by the late Duke of Norfolk, and thence called the Norfolk Spaniel. It is larger than the common springer, and stancher, and stouter. It often forms a strong individual attachment, and is unhappy and pines away when separated from its master. It is more ill-tempered than the common springer, and, if not well broken in, is often exceedingly obstinate.

THE BLACK AND TAN SPANIEL,

the cross of the terrier being nearly or quite got rid of, is often a beautiful animal, and is much valued, although it is frequently considered a somewhat stupid animal. The cocker and the springer are sometimes used as finders in coursing.

THE BLENHEIM SPANIEL,

a breed cultivated by one of the Dukes of Marlborough, belongs to this division. From its beauty, and occasional gaiety, it is oftener an inhabitant of the drawing-room than the field; but it occa-

sionally breaks out, and shows what nature designed it for. Some of these carpeted pets acquit themselves nobly in the covert. There they ought oftener to be; for they have not much individuality of attachment to recommend them, and, like other spoiled animals, both quadruped and biped, misbehave. The breed has degenerated of late, and is not always to be had pure, even in the neighbourhood of Blenheim. This spaniel may be distinguished by the length and silkiness of the coat, the deep fringe about the ear, the arch and deep-feathering of the tail, the full and moist eye, and the blackness of the palate.

THE WATER-SPANIEL.

Of this breed there are two varieties, a larger and smaller, both useful according to the degree of range or the work required; the smaller, however, being ordinarily preferable. Whatever be his general size, strength and compactness of form are requisite. His head is long, his face smooth, and his limbs, more developed than those of the springer, should be muscular, his carcass round, and his hair long and closely curled. Good breaking is more necessary here than even with the land-spaniel, and, fortunately, it is more easily accomplished; for the water-spaniel, although a stouter, is a more docile animal than the land one.

Docility and affection are stamped on his countenance, and he rivals every other breed in his attachment to his master. His work is double; first to find, when ordered so to do, and to back behind the sportsman when the game will be more advantageously trodden up. In both he must be taught to be perfectly obedient to the voice, that he may be kept within range, and not unnecessarily disturb the birds. A more important part of his duty, however, is to find and bring the game that has dropped. To teach him to find is easy enough, for a young water-spaniel will as readily take to the water as a pointer puppy will stop; but to bring his game without tearing is a more difficult lesson, and the most difficult of all is to make him suspend the pursuit of the wounded game while the sportsman re-loads.

The water-spaniel was originally from Spain; but the pure breed has been lost, and the present dog is probably descended from the large water-dog and the English setter.

The water and land spaniels differ materially from each other. The water-spaniel, although when at his work being all that his master can desire, is, when unemployed, comparatively a slow and inactive dog; but under this sobriety of demeanour is concealed a strength and fidelity of attachment to which the more lively land-spaniel cannot always lay just claim. The writer of this work once saved a young water-spaniel from the persecution of a crowd of people who had



THE WATER-SPANIEL.

driven it into a passage, and were pelting it with stones. The animal had the character of being, contrary to what his species usually are, exceedingly savage; and he suffered himself to be taken up by me and carried from his foes with a kind of sullenness; but when, being out of the reach of danger, he was put down, he gazed on his deliverer, and then crouched at his feet.

From that moment he attached himself to his new master with an intensity of affection scarcely conceivable—never expressed by any boisterous caresses, but by endeavouring to be in some manner in contact with him; resting his head upon his foot; lying upon some portion of his apparel, his eye intently fixed upon him, endeavouring to understand every expression of his countenance. He would follow one gentleman, and one only, to the river-side, and behave gallantly and nobly there; but the moment he was dismissed he would scamper home, gaze upon his master, and lay himself down at his feet. In one of these excursions he was shot. He crawled home, reached his master's feet, and expired in the act of licking his hand.

Perhaps the author may be permitted to relate one story more of the water-spaniel: he pledges himself for its perfect truth. The owner of the dog is telling this tale. "I was once on the sea-coast, when a small, badly-formed, and leaky fishing-boat was cast on shore, on a fearful reef of

rocks. Three men and a boy of ten years old constituted the crew. The men swam on shore, but they were so bruised against the rocks, that they could not render any assistance to the poor boy, and no person could be found to venture out in any way. I heard the noise, and went to the spot with my dog. I spoke to him, and in he went, more like a seal than a dog; and after several fruitless attempts to mount the wreck, he succeeded, and laid hold of the boy, who clung to the ropes, screaming in the most fearful way at being thus dragged into the water. The waves dashed frightfully on the rocks. In the anxiety and responsibility of the moment I thought that the dog had missed him, and I stripped off my clothes, resolved to render what assistance I could. I was just in the act of springing from the shore, having selected the moment when the receding waves gave me the best chance of rendering any assistance, when I saw old 'Bagsman,' for that was the name of my dog, with the struggling boy in his mouth, and the head uppermost. I rushed to the place where he must land, and the waves bore the boy and the dog into my arms.

"Some time after that I was shooting wild-fowl. I and my dog had been working hard, and I left him behind me while I went to a neighbouring town to purchase gunpowder. A man, in a drunken frolic, had pushed off in a boat with a girl in it; the tide going out, carried the boat quickly

away, and the man becoming frightened, and unable to swim, jumped overboard. Bagsman, who was on the spot, hearing the splash, jumped in, swam out to the man, caught hold of him, and brought him twenty or thirty yards towards the shore, when the drunken fellow clasped the dog tight round the body, and they both went down together. The girl was saved by a boat going to her assistance. The body of the man was recovered about an hour afterwards, with that of the dog clasped tight in his arms, thus dragging him to the bottom. 'Poor Bagsman! thy worth deserves to be thus chronicled.'

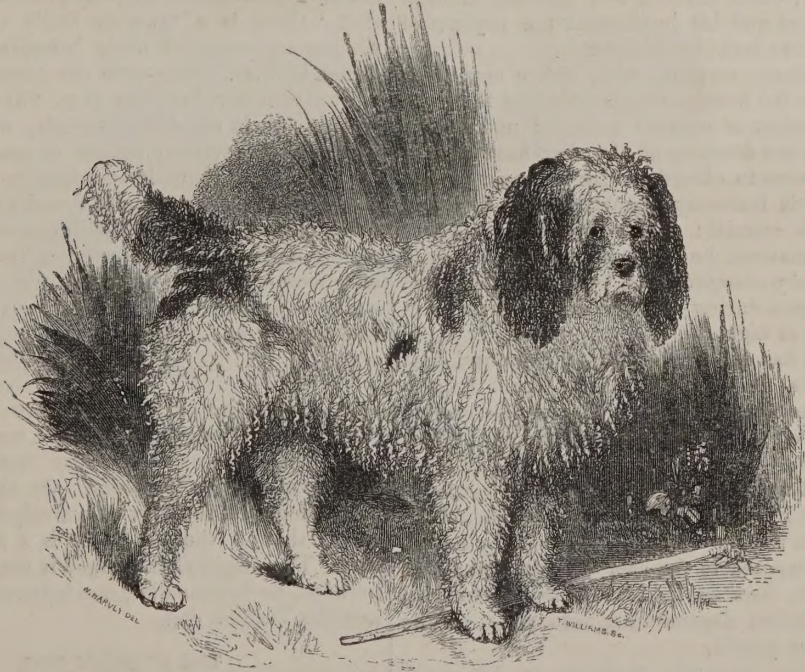
THE POODLE.

The particular cross from which this dog descended is unknown, but the variety produced has been carefully preserved. It is, probably, of continental origin, and is known by its thick curly hair concealing almost every part of the face, and giving it the appearance of a short, thick, unintelligent head. When, however, that hair is removed,

there is still the large head; but there is also the cerebral cavity more capacious than in any other dog, and the frontal sinuses fully developed, and exhibiting every indication of the intellectual class to which it belongs.

It was originally a water-dog, as its long and curly hair, and its propensities in its domesticated state, prove; but, from its peculiar sagacity, it is capable of being trained to almost any useful purpose, and its strong individual attachment renders it more the companion of man than a mere sporting dog: indeed, its qualities as a sporting dog are seldom recognised by its owner.

These dogs have far more courage than the water-spaniel, all the sagacity of the Newfoundland, more general talent, if the expression may be used, and more individual attachment than either of them, and without the fawning of the one, or the submissiveness of the other. The poodle seems conscious of his worth, and there is often a quiet dignity accompanying his demonstrations of friendship.



THE POODLE.

This dog, however, possesses a very peculiar kind of intelligence. It will almost perform the common offices of a servant: it will ring the bell and open the door. Mr. Wilkie, of Ladythorn in Northumberland, had a poodle which he had instructed to go through all the apparent agonies of dying. He would fall on one side, stretch

himself out, and move his hind legs as if he were in great pain; he would next simulate the convulsive throbs of departing life, and then stretch out his limbs and thus seem as if he had expired. In this situation he would remain motionless, until he had his master's command to rise.

The portrait of Sancho, a poodle, that was

with difficulty forced from the grave of his master, after the battle of Salamanca, is familiar to many of our readers. Enticed from his post he could not be, nor was he at length taken away until weakened by grief and starvation. He by degrees attached himself to his new master, the Marquis of Worcester, but not with the natural ardour of a poodle. He was attentive to every command, and could perform many little domestic offices. Sometimes he would exhibit considerable buoyancy of spirit; but there oftener seemed to be about him the recollection of older and closer friendship.

Another poodle occupies an interesting place in the history of the Peninsular war. He too belonged to a French officer, who was killed at the battle of *Castella*. The French were compelled to retreat before they could bury their dead, and the soldiers wished to carry with them this regimental favourite; but he would not be forced from the corpse of his master. Some soldiers afterwards traversing the field of battle, one of them discovered the cross of the Legion of Honour on the breast of the fallen officer, and stooped to take it away, when the dog flew savagely at him, and would not quit his hold, until the bayonet of another soldier laid him lifeless.

A veterinary surgeon, who, before any other animal than the horse was acknowledged to be the legitimate object of medical care, did not disdain to attend to the diseases of the dog, used to say that there were two breeds which he never wished to see in his infirmary, namely, the poodle and the Norfolk spaniel; for, although not always difficult to manage, he could never attach them to him, but they annoyed him by their pitiful and imploring gaze during the day, and their mournful howling at night.

Custom has determined that the natural coat of this animal shall be taken from him. It may be a relief to the poodle for a part of his coat to be stripped off in hot weather, and the curley hair which is left on his chest, contrasted with his smooth and well-rounded loins and quarters, may make it look pretty enough; but it should be remembered that he was not designed by nature to be thus exposed to the cold of winter, and that there are no dogs so liable to rheumatism, and that rheumatism degenerating into palsy, as the well-trimmed poodle.

THE BARBET

is a small poodle, the production of some unknown and disadvantageous cross with the true poodle. It has all the sagacity of the poodle, and will perform even more than his tricks. It is always in action; always fidgety; generally incapable of much affection, but inheriting much self-love and occasional ill temper; unmanageable by any one but its owner; eaten up with red mange; and

frequently a nuisance to its master and a torment to every one else.

We must not, however, do it injustice; it is very intelligent, and truly attached to its owner.

The barbet possesses more sagacity than most other dogs, but it is sagacity of a particular kind, and frequently connected with various amusing tricks. Mr. Jesse, in his *Gleanings in Natural History*, gives a singular illustration of this. A friend of his had a barbet that was not always under proper command. In order to keep him in better order, he purchased a small whip, with which he corrected him once or twice during a walk. On his return the whip was put on a table in the hall, but on the next morning it was missing. It was soon afterwards found concealed in an out-building, and again made use of in correcting the dog. Once more it would have been lost, but, on watching the dog, who was suspected of having stolen it, he was seen to take it from the hall table in order to hide it once more.

THE MALTESE DOG

can be traced back to an early period. Strabo says that "there is a town in Sicily called Melita, whence are exported many beautiful dogs called *Canes Melitæi*. They were the peculiar favourites of the women; but now (A.D. 25) there is less account made of these animals, which are not bigger than common ferrets or weasels, yet they are not small in understanding nor unstable in their love." They are also found in Malta and in other islands of the Mediterranean, and they maintain the same character of being devotedly affectionate to their owners, while, it is added—and they are not loved the less for that—they are ill-tempered to strangers.

THE LION DOG

is a diminutive likeness of the noble animal whose name it bears. Its head, neck, shoulders, and fore-legs down to the very feet, are covered with long, wavy, silky hairs. On the other parts of the dog it is so short as scarcely to be grasped, except that on the tail there is a small bush of hair. The origin of this breed is not known; it is, perhaps, an intermediate one between the Maltese and the Turkish dog.

THE TURKISH DOG,

as it is improperly called, is a native of hot climates. The supposition of Buffon is not an improbable one, that, being taken from some temperate country to one considerably hotter, the European dog probably acquired some cutaneous disease. This is no uncommon occurrence in Guinea, the East Indies, and South America. Some of these animals afterwards found their way into Europe, and, from their singularity, care was taken to

multiply the breed. Aldrovandus states that the first two of them made their appearance in Europe in his time, but the breed was not continued, on account, as it was supposed, of the climate being too cold for them.

The few that are occasionally seen in England bear about them every mark of a degenerated race. They have no activity, and they show little intelligence or affection. One singular circumstance appertains to all that the author of this work has had the opportunity of seeing,—their teeth became very early diseased, and drop from the gums. That eminent zoologist, Mr. Yarrell, examining, with the author of this work, one that

had died, certainly not more than five years old, found that it had neither incisors nor canine teeth, and that the molars were reduced to one on each side, the large tubercular tooth being the only one that was remaining. At the scientific meeting at the Zoological Society, the same gentlemen stated, that he had examined the mouths of two individuals of the same variety, then alive at the gardens, in both of which the teeth were remarkably deficient. In neither of them were there any false molars, and the incisors in both were deficient in number. Before the age of four years the tongue is usually disgustingly hanging from the mouths of these animals.



THE ALPINE SPANIEL, OR BERNARDINE DOG,

is a breed almost peculiar to the Alps, and to the district between Switzerland and Savoy. The passes over these mountains are exceedingly dangerous from their steepness and narrowness. A precipice of many hundred feet is often found on one side, and perpendicular rocks on the other, while the path is glazed with frozen snow or ice. In many places the path is overhung with huge masses of frozen snow, which occasionally loosen and fall, when the dreadful storms peculiar to

these regions suddenly come on, and form an insurmountable barrier, or sweep away or bury the unfortunate traveller. Should he escape these dangers, the path is now become trackless, and he wanders amid the dreary solitudes until night overtakes him; and then, when he pauses from fatigue or uncertainty with regard to the path he should pursue, his limbs are speedily benumbed. Fatal slumbers, which he cannot shake off, steal upon him, and he crouches under some ledge, and

sleeps, to wake no more. The snow drifts on. It is almost continually falling, and he is soon concealed from all human help.

On the top of Mount St. Bernard, and near one of the most dangerous of these passes, is a convent, in which is preserved a breed of large dogs trained to search for the benighted and frozen wanderer. Every night, and particularly when the wind blows tempestuously, some of these dogs are sent out. They traverse every path about the mountains, and their scent is so exquisite that they can discover the traveller, although he may lie many feet deep in the snow. Having found him, they set to work and endeavour to scrape away the snow, uttering a deep bark that reverberates from rock to rock, and tells those who are watching in the convent that some poor wretch is in peril. Generally, a little flask of spirits is tied round the neck of the animal, by drinking which the benighted traveller may recruit his strength, until more effectual rescue arrive. The monks hasten in the direction of the sound, and often succeed in rekindling the vital spark before it is quite extinguished. Very many travellers have been thus rescued from death by these benevolent men and their intelligent and interesting quadruped servants.

One of these Bernardine dogs, named Barry, had a medal tied round his neck as a badge of honourable distinction, for he had saved the lives of forty persons. He at length died nobly in his vocation. A Piedmontese courier arrived at St. Bernard on a very stormy day, labouring to make his way to the little village of St. Pierre, in the valley beneath the mountain, where his wife and children lived. It was in vain that the monks attempted to check his resolution to reach his family. They at last gave him two guides, each of whom was accompanied by a dog, one of which was the remarkable creature whose services had been so valuable. Descending from the convent they were overwhelmed by two avalanches or heaps of falling snow, and the same destruction awaited the family of the poor courier, who were travelling up the mountain in the hope of obtaining some news of the husband and father.

A beautiful engraving has been made of this noble dog. It represents him as saving a child which he had found in the Glacier of Balsore, and cherished, and warmed, and induced to climb upon his shoulders, and thus preserved from, otherwise, certain destruction.

THE NEWFOUNDLAND DOG.

The Newfoundland is a spaniel of large size. He is a native of the island of which he bears the name; but his history is disgraceful to the owners of so valuable an animal. The employment of the lower classes of the inhabitants of St.

John, in Newfoundland, is divided between the cutting of wood, and the drawing of it and other merchandise in the winter, and fishing in the summer. The carts used in the winter work are drawn by these dogs, who are almost invariably urged and goaded on beyond their strength, fed only with putrid salt-fish, and an inadequate quantity even of that. A great many of them are worn out and die before the winter is over; and, when the summer approaches, and the fishing season commences, many of them are quite abandoned, and, uniting with their companions, prowl about preying on the neighbouring flocks, or absolutely starving.

Mr. Macgregor, however, states that "in almost every other part of British America they are valuable and useful. They are remarkably docile and obedient to their masters, serviceable in all the fishing countries, and yoked in pairs to draw the winter's fuel home. They are faithful, good-natured, and ever friendly to man. They will defend their master and their master's property, and suffer no person to injure either the one or the other; and, however extreme may be the danger, they will not leave them for a minute. They seem only to want the faculty of speech, in order to make their good wishes and feelings understood, and they are capable of being trained for all the purposes for which every other variety of the canine species is used."*

That which most recommends the Newfoundland dog is his fearlessness of water, and particularly as connected with the preservation of human life. The writer of the present work knows one of these animals that has preserved from drowning four human beings.

A native of Germany was travelling one evening on foot through Holland, accompanied by a large dog. Walking on a high bank which formed one side of a dyke, his foot slipped, and he was precipitated into the water; and, being unable to swim, soon became senseless. When he recovered his recollection, he found himself in a cottage on the contrary side of the dyke, surrounded by peasants, who had been using the means for the recovery of drowned persons. The account given by one of them was, that returning home from his labour, he observed at a considerable distance a large dog in the water, swimming and dragging, and sometimes pushing along something that he seemed to have great difficulty in supporting, but which he at length succeeded in getting into a small creek on the opposite side. When the animal had pulled what he had hitherto supported as far out of the water as he was able, the peasant discovered that it was the body of a man, whose face and hands the dog was indus-

* Historical and Descriptive Sketches of British America, by J. Macgregor.



THE NEWFOUNDLAND DOG.

triously licking. The peasant hastened to a bridge across the dyke, and, having obtained assistance, the body was conveyed to a neighbouring house, where proper means soon restored the drowned man to life. Two very considerable bruises, with the marks of teeth, appeared, one on his shoulder, and the other on his poll; hence it was presumed that the faithful beast had first seized his master by the shoulder, and swam with him in this manner for some time, but that his sagacity had prompted him to quit this hold, and to shift it to the nape of the neck, by which he had been enabled to support the head out of water; and in this way he had conveyed him nearly a quarter of a mile before he had brought him to the creek, where the banks were low and accessible.

Dr. Beattie relates an instance of a gentleman attempting to cross the river Dee, then frozen over, near Aberdeen. The ice gave way about the middle of the river; but, having a gun in his hand, he supported himself by placing it across the opening. His dog then ran to a neighbouring village, where, with the most significant gestures, he pulled a man by the coat, and prevailed on him

to follow him. They arrived at the spot just in time to save the drowning man's life.

Of the noble disposition of the Newfoundland dog, Dr. Abel, in one of his lectures on Phrenology, relates a singular instance. "When this dog left his master's house, he was often assailed by a number of little noisy dogs in the street. He usually passed them with apparent unconcern, as if they were beneath his notice; but one little cur was particularly troublesome, and at length carried his impudence so far as to bite the Newfoundland dog in the leg. This was a degree of wanton insult beyond what he could patiently endure; and he instantly turned round, ran after the offender, and seized him by the skin of the back. In this way he carried him in his mouth to the quay, and holding him some time over the water, at length dropped him into it. He did not, however, seem to design that the culprit should be punished capitally. He waited a little while, until the poor animal, who was unused to that element, was not only well ducked, but nearly sinking, and then plunged in, and brought him safe to land."

"It would be difficult," says Dr. Hancock, "in

his *Essay on Instinct*, "to conceive any punishment more aptly contrived, or more completely in character. Indeed, if it were fully analyzed, an ample commentary might be written in order to show what a variety of comparisons and motives and generous feelings entered into the composition of this act."

No one ever drew more legitimate consequences from certain existing premises.

One other story should not be omitted of this noble breed of water-dogs. A vessel was driven on the beach of Lydd, in Kent. The surf was rolling furiously. Eight poor fellows were crying for help, but not a boat could be got off to their assistance. At length a gentleman came on the beach, accompanied by his Newfoundland dog; he directed the attention of the animal to the vessel, and put a short stick into his mouth. The intelligent and courageous fellow at once understood his meaning, sprung into the sea, and fought his way through the waves. He could not, however, get close enough to the vessel to deliver that with which he was charged; but the crew understood what was meant, and they made fast a rope to another piece of wood, and threw it towards him. The noble beast dropped his own piece of wood, and immediately seized that which had been cast to him, and then, with a degree of strength and determination scarcely credible—for he was again and again lost under the waves—he dragged it through the surge and delivered it to his master. A line of communication was thus formed, and every man on board was rescued.

There is, however, a more remarkable fact recorded in the *Penny Magazine*. "During a heavy gale a ship had struck on a rock near the land. The only chance of escape for the shipwrecked was to get a rope ashore; for it was impossible for any boat to live in the sea as it was then running. There were two Newfoundland dogs and a bull-dog on board. One of the Newfoundland dogs was thrown overboard, with a rope thrown round him, and perished in the waves. The second shared a similar fate: but the bull-dog fought his way through that terrible sea, and, arriving safe on shore, rope and all, became the saviour of the crew."

Some of the true Newfoundland dogs have been brought to Europe, and have been used as retrievers. They are principally valuable for the fearless manner in which they will penetrate the thickest cover. They are comparatively small, but muscular, strong, and generally black. A larger variety has been bred, and is now perfectly established. He is seldom used as a sporting dog, or for draught, but is admired on account of his stature and beauty, and the different colours with which he is often marked. Perhaps he is not quite so good-natured and manageable as the

smaller variety, and yet it is not often that much fault can be found with him on this account.

A noble animal of this kind was presented to the Zoological Society, by His Royal Highness Prince Albert. He was a great ornament to the gardens; but he had been somewhat unmanageable, and had done some mischief before he was sent thither.

A portion of Lord Byron's beautiful epitaph on the death of his Newfoundland dog will properly close our account of this animal:—

"The poor dog! in life the firmest friend,
The first to welcome, foremost to defend;
Whose honest heart is still his master's own;
Who labours fights, lives, breathes, for him alone."

THE ESQUIMAUX DOG

is a beast of burden and of draught, usefully employed by the inhabitants of the extreme parts of North America and the neighbouring islands. When the Esquimaux Indian goes in pursuit of the seal, the rein-deer, or the bear, his dogs carry the materials of his temporary hut, and the few necessities of his simple life; or, yoked to the sledge, often draw him and his family full sixty miles a-day over the frozen plains of these inhospitable regions. At other times they assist in the chase, and run down and destroy the bear and the rein-deer on land, and the seal on the coast.

Their journeys are often without any certain object; but, if the dogs scent the deer or the bear, they gallop away in that direction until their prey is within reach of the driver, or they are enabled to assist in destroying their foe. Captain Parry, in his *Journal of a Second Voyage for the Discovery of a North-West Passage*, gives an amusing account of these expeditions. "A number of dogs, varying from six to twelve, are attached to each sledge by means of a single trace, but with no reins. An old and tried dog is placed as the leader, who, in their simple journeys, and when the chase is the object, steadily obeys the voice of the driver sitting in front of the sledge, with a whip long enough to reach the leader. This whip, however, is used as seldom as possible; for these dogs, although tractable, are ferocious, and will endure little correction. When the whip is applied with severity on one, he falls upon and worries his neighbour, and he, in his turn, attacks a third, and there is a scene of universal confusion; or the dogs double from side to side to avoid the whip, and the traces become entangled, and the safety of the sledge endangered. The carriage must then be stopped, each dog put into his proper place, and the traces re-adjusted. This frequently happens several times in the course of the day. The driver, therefore, depends principally on the docility of the leader, who, with admirable precision, quickens or slackens his pace,



THE ESQUIMAUX DOG.

and starts off or stops, or turns to the right or left, at the summons of his master. When they are journeying homeward, or travelling to some spot to which the leader has been accustomed to go, he is generally suffered to pursue his own course; for although every trace of the road is lost in the drifting snow, he scents it out, and follows it with undeviating accuracy. Even the leader, however, is not always under the control of his master. If the journey lies homeward, he will go his own pace, and that is usually at the top of his speed; or, if any game starts, or he scents it at a distance, no command of his driver will restrain him. Neither the dog nor his master is half civilized or subdued."

Each of these dogs will draw a weight of 120 lbs. over the snow, at the rate of seven or eight miles an hour.

In summer, many of these dogs are used as beasts of burden, and each carries from thirty to fifty pounds. They are then much better kept than in the winter; for they have the remains of the whale and sea-calf, which their masters disdain to eat. The majority, however, are sent adrift in the summer, and they live on the produce of the chase or of their constant thievery. The exactness with which—the summer being past—each returns to his master, is an admirable proof of sagacity, and frequently of attachment.

In some parts of Siberia, on the borders of the Oby, there are established relays of dogs, like the

post-horses in other countries. Four of these are attached to a very light vehicle; but, when much haste is required, or any very heavy goods are to be conveyed, more than treble or quadruple that number are harnessed to the vehicle. M. de Lesseps* gives an almost incredible account of this. He is speaking of the voracity of these poor beasts, in the midst of the snowy desert, with little or no food. "We had unharnessed our dogs, in order to bring them closer together, in the ordinary way; but, the moment they were brought up to the pole, they seized their harness, constructed of the thickest and toughest leather, and tore it to pieces, and devoured it. It was in vain that we attempted every means of restraint. A great number of them escaped into the wilds around, others wandered here and there, and seized everything that came within their reach, and which their teeth could destroy. Almost every minute some one of them fell exhausted, and immediately became the prey of the others. Every one that could get within reach struggled for his share. Every limb was disputed, and torn away by a troop of rivals, who attacked all within their reach. As soon as one fell by exhaustion or accident, he was seized by a dozen others, and destroyed in the space of a few minutes. In order to defend ourselves from this crowd of famished beasts, we were compelled to have recourse to our bludgeons and our swords."

* Journal Historique du Voyage de M. de Lesseps. Paris 1790. 2 vols.—tome 1.

To this horrible scene of mutual destruction succeeded, on the following day, the sad appearance of those that surrounded the sledge, to which we had retreated for safety and for warmth. They were thin, and starved, and miserable; they could scarcely move; their plaintive and continual howlings seemed to claim our succour; but there was no possibility of relieving them in the slightest degree, except that some of them crept to the opening in our carriage through which the smoke escapes; and the more they felt the warmth the closer they crept, and then, through mere feebleness, losing their equilibrium, they rolled into the fire before our eyes."

These dogs are not so high as the common pointer, but much larger and stouter, although their thick hair, three or four inches long in the winter, gives them an appearance of more stoutness than they possess. Under this hair is a coating of fine close soft wool, which begins to grow in the early part of winter, and drops off in the spring. Their muzzles are sharp and generally black, and their ears erect.

The Greenland, and Siberian, and Kamtschadale, are varieties of the Esquimaux or Arctic dogs, but enlarged in form, and better subdued. The docility of some of these is equal to that of any European breed.

A person of the name of Chabert, who was afterwards better known by the title of "Fire King," had a beautiful Siberian dog, who would draw him in a light carriage 20 miles a-day. He asked £200 for him, and sold him for a considerable portion of that sum; for he was a most beautiful animal of his kind, and as docile as he was beautiful. Between the sale and the delivery the dog fell and broke his leg. Chabert, to whom the price agreed on was of immense consequence, was in despair. He took the dog at night to a veterinary surgeon. He formally introduced them to each other. He talked to the dog, pointed to his leg, limped around the room, then requested the surgeon to apply some bandages around the leg, and he seemed to walk sound and well. He patted the dog on the head, who was looking alternately at him and the surgeon, desired the surgeon to pat him, and to offer him his hand to lick, and then, holding up his finger to the dog, and, gently shaking his head, quitted the room and the house. The dog immediately laid himself down, and submitted to a reduction of the fracture, and the bandaging of the limb, without a motion, except once or twice licking the hand of the operator. He was quite submissive, and in a manner motionless, day after day, until, at the expiration of a month, the limb was sound. Not a trace of the fracture was to be detected, and the purchaser, who is now living, knew nothing about it.

The employment of the Esquimaux dogs is nearly the same as those from Newfoundland, and most valuable they are to the traveller who has to find his way over the wild and trackless regions of the north. The manner, however, in which they are generally treated seems ill calculated to cause any strong or lasting attachment. During their period of labour, they, like their brethren in Newfoundland, are fed sparingly on putrid fish, and in summer they are turned loose to shift for themselves until the return of the severe season renders it necessary to their masters' interest that they should again be sought for, and once more reduced to their state of toil and slavery.

They have been known for several successive days to travel more than 60 miles. They seldom miss their road, although they may be driven over one untrodden snowy plain, where they are occasionally unable to reach any place of shelter. When, however, night comes, they partake with their master of the scanty fare which the sledge will afford, and, crowding round, keep him warm and defend him from danger. If any of them fall victims to the hardships to which they are exposed, their master or their companions frequently feed on their remains, and their skins are converted into warm and comfortable dresses.

THE LAPLAND DOG.

Captain Clarke thus describes the Lapland dog:—"We had a valuable companion in a dog belonging to one of the boatmen. It was of the true Lapland breed, and in all respects similar to a wolf, excepting the tail, which was bushy and curled like those of the Pomeranian race. This dog, swimming after the boat, if his master merely waved his hand, would cross the lake as often as he pleased, carrying half his body and the whole of his head and tail out of the water. Wherever he landed, he scoured all the long grass by the side of the lake in search of wild-fowl, and came back to us, bringing wild-ducks in his mouth to the boat, and then, having delivered his prey to his master, he would instantly set off again in search of more."*

But we pass on to another and more valuable species of the dog—

THE SHEEP-DOG.

The origin of the sheep-dog is somewhat various; but the predominant breed is that of the intelligent and docile spaniel. Although it is now found in every civilized country in which the sheep is cultivated, it is not coeval with the domestication of that animal. When the pastures were in a manner open to the first occupant, and every shepherd had a common property in them, it was

* Clarke's Scandinavia, vol. i. p. 432.

not so necessary to restrain the wandering of the sheep, and the voice of the shepherd was usually sufficient to collect and to guide them. He preceded the flock, and they "followed him whithersoever he went." In process of time, however, man availed himself of the sagacity of the dog to diminish his own labour and fatigue, and this useful servitor became the guide and defender of the flock.

The sheep-dog possesses much of the same form and character in every country. The muzzle is sharp, the ears are short and erect, and the animal is covered, particularly about the neck, with thick and shaggy hair. He has usually two dew claws on each of the hind legs; not, however, as in the one claw of other dogs, having a jointed attachment to the limb, but merely connected by the skin and some slight cellular substance. These excrescences should be cut off when the dog is young. The tail is slightly turned upwards and long, and almost as bushy as that of a fox, even in that variety whose coat is almost smooth. He is of a black colour, or black prevails, mixed with gray or brown.

Professor Grogner gives the following account of this dog as he is found in France:—"The shepherd's dog, the least removed from the natural type of the dog, is of a middle size; his ears short

and straight; the hair long, principally on the tail, and of a dark colour; the tail is carried horizontally or a little elevated. He is very indifferent to caresses, possessed of much intelligence and activity to discharge the duties for which he was designed. In one or other of its varieties it is found in every part of France. Sometimes there is but a single breed, in others there are several varieties. It lives and maintains its proper characteristics, while other races often degenerate. Everywhere it preserves its proper distinguishing type. It is the servant of man, while other breeds vary with a thousand circumstances. It has one appropriate mission, and that it discharges in the most admirable way: there is evidently a kind and wise design in this."

This account of the French sheep-dog, or of the sheep-dog everywhere, is as true as it is beautiful. One age succeeds to another, we pass from one climate to another, and everything varies and changes, but the shepherd's dog is what he ever was—the guardian of our flocks. There are, however, two or more species of this dog; the one which Professor Grogner has described, and which guards and guides the sheep in the open and level country, where wolves seldom intrude; another crossed with the mastiff, or little removed from that dog, used in the woody and mountainous



THE ENGLISH SHEEP-DOG

countries, their guard more than their guide.* In Great Britain, where he has principally to guide

* The migratory sheep, in some parts of the south of France almost as numerous as in Spain, are attended by a *goat* as a guide; and the intelligence and apparent pride which he displays are remarkable.

and not to guard the flock, he is comparatively a small dog. He is so in the northern and open parts of the country, where activity is principally wanted; but, in the more enclosed districts, and where strength is often needed to turn an obstinate

sheep, he is crossed with some larger dog, as the rough terrier, or sometimes the pointer, or now and then the bull-dog: in fact, almost any variety that has strength and stoutness may be employed. Thus we obtain the larger sheep-dog and the drover's dog. The sagacity, forbearance, and kindness of the sheep-dog are generally retained, but from these crosses there is occasionally a degree of ferocity from which the sheep often suffer.

In other countries, where the flock is exposed to the attack of the wolf, the sheep-dog is larger than the British drover's dog, and not far inferior in size to the mastiff. The strength and ferocity which qualify him to combat with the wolf, would occasionally be injurious or fatal to those who somewhat obstinately opposed his direction; therefore, in Denmark and in Spain, the dog is rarely employed to drive the flock. It is the office of the shepherd to know every individual under his charge, to, as in olden times, "call them all by their names," and have always some docile and tamed wether who will take the lead, almost as subservient to his voice as is the dog himself, and whom the flock will immediately follow.

In whatever other country the dog is used, partly or principally to protect the flock from the ravages of the wolf, he is as gentle as a lamb, except when opposed to his natural enemy; and it is only in England that the guardian of the sheep occasionally injures and worries them, and that many can be found bearing the mark of the tooth. This may be somewhat excusable (although it is often carried to a barbarous extent) in the drover's dog; but it will admit of no apology in the shepherd's dog. It is the result of the idleness of the boy, or the mingled brutality and idleness of the shepherd, who is attempting to make the dog do his own work and that of his master too. We have admired the Prussian sheep-dog in the discharge of his duty, and have seen him pick out the marked sheep, or stop and turn the flock, as cleverly as any Highland colley, but he never bit them. He is a shorter, stronger, and more compact dog than ours. He pushes against them and forces them along. If they rebel against this mild treatment, the shepherd is at hand to enforce obedience; and the flock is as easily and perfectly managed as any English or Highland one, and a great deal more so than the majority that we have seen.

Mr. Trimmer, in his work on the Merinos, speaking of the Spanish flocks, says:—"There is no driving of the flock; that is a practice entirely unknown; but the shepherd, when he wishes to remove his sheep, calls to him a tame wether accustomed to feed from his hands. The favourite, however distant, obeys his call, and the rest follow. One or more of the dogs, with large collars armed with spikes, in order to protect them from the

wolves, precede the flock, others skirt it on each side, and some bring up the rear. If a sheep be ill or lame, or lag behind unobserved by the shepherds, they stay with it and defend it until some one return in search of it. With us dogs are too often used for other and worse purposes. In open unenclosed districts they are indispensable; but in others I wish them, I confess, either managed, or encouraged less. If a sheep commits a fault in the sight of an intemperate shepherd, or accidentally offends him, it is *dogged* into obedience: the signal is given, the dog obeys the mandate, and the poor sheep flies round the field to escape from the fangs of him who should be his protector, until it becomes half dead with fright and exhaustion, while the trembling flock crowd together dreading the same fate, and the churl exults in this cowardly victory over a weak and defenceless animal."*

If the farmer will seriously calculate the number of ewes that have yeaned before their time, and of the lambs that he has lost, and the accidents that have occurred from the sheep pressing upon one another in order to escape from the dog, and if he will also take into account the continual disturbance of the sheep while grazing, by the approach of the dog, and the consequent interference with the cropping and the digestion of the food, he will attach more importance to the good temper of the dog and of the shepherd than he has been accustomed to do. There would be no injustice, or rather a great deal of propriety, in inflicting a fine for every tooth-mark that could be detected. When the sheep, instead of collecting round the dog, and placing themselves under his protection on any sudden alarm, uniformly fly from him with terror, the farmer may be assured there is something radically wrong in the management of the flock.

Instinct and education combine to fit this dog for our service. The pointer will act without any great degree of instruction, and the setter will crouch; and most certainly the sheep-dog, and especially if he has the example of an older and expert one, will, almost without the teaching of the master, become everything that can be wished, obedient to every order, even to the slightest motion of the hand. There is a natural predisposition for the office he has to discharge, which it requires little trouble or skill to develop and perfect.

It is no unpleasing employment to study the degree in which the several breeds of dogs are not only highly intelligent, but fitted by nature for the particular duty they have to perform. The pointer, the setter, the hound, the greyhound, the terrier, the spaniel, and even the bull-dog, were made,

* Trimmer on the Merinos, p. 50. See also the Society's work on Sheep



THE SCOTCH SHEEP-DOG.

and almost perfected, by nature chiefly for one office alone, although they may be useful in many other ways. This is well illustrated in the sheep-dog. If he be but with his master, he lies content, indifferent to every surrounding object, seemingly half asleep and half awake, rarely mingling with his kind, rarely courting, and generally shrinking from, the notice of a stranger; but the moment duty calls, his sleepy listless eye becomes brightened; he eagerly gazes on his master, inquires and comprehends all he is to do, and, springing up, gives himself to the discharge of his duty with a sagacity, and fidelity, and devotion, too rarely equalled even by man himself.

Mr. James Hogg, the Ettrick Shepherd, living in his early days among the sheep and their quadruped attendants, and an accurate observer of nature, as well as an exquisite poet, gives some anecdotes of the colley (the Highland term for sheep-dog), with which the reader will not be displeased. "My dog, Sirrah," says he, in a letter to the Editor of Blackwood's Edinburgh Magazine, "was, beyond all comparison, the best dog I ever saw. He had a somewhat surly and unsocial temper, disdaining all flattery, and refusing to be caressed; but his attention to my commands and interest will never again be equalled by any of the canine race. When I first saw him a drover was leading him with a rope. He was both lean and hungry, and far from being a beautiful animal; for he was almost black, and had a grim face, striped with dark brown. I

thought I perceived a sort of sullen intelligence in his countenance, notwithstanding his dejected and forlorn appearance, and I bought him. He was scarcely a year old, and knew so little of herding that he had never turned a sheep in his life; but, as soon as he discovered that it was his duty to do so, and that it obliged me, I can never forget with what anxiety and eagerness he learned his different evolutions, and when I once made him understand a direction he never forgot or mistook it."

On one night, a large flock of lambs that were under the Ettrick Shepherd's care, frightened by something, scampered away in three different directions across the hills, in spite of all that he could do to keep them together. "Sirrah," said the shepherd, "they're a' awa!"

It was too dark for the dog and his master to see each other at any considerable distance, but Sirrah understood him, and set off after the fugitives. The night passed on, and Hogg and his assistant traversed every neighbouring hill in anxious but fruitless search for the lambs: but he could hear nothing of them nor of the dog, and he was returning to his master with the doleful intelligence that he had lost all his lambs. "On our way home, however," says he, "we discovered a lot of lambs at the bottom of a deep ravine called the Flesh Cleuch, and the indefatigable Sirrah standing in front of them, looking round for some relief, but still true to his charge. We concluded that it was one of the divisions which Sirrah had

been unable to manage, until he came to that commanding situation. But what was our astonishment when we discovered that not one lamb of the flock was missing! How he had got all the divisions collected in the dark, is beyond my comprehension. The charge was left entirely to himself from midnight until the rising sun; and, if all the shepherds in the forest had been there to have assisted him, they could not have effected it with greater promptitude. All that I can say is, that I never felt so grateful to any creature under the sun as I did to my honest Sirrah that morning."

A shepherd, in one of his excursions over the Grampian Hills to collect his scattered flock, took with him (as is a frequent practice, to initiate them in their future business) one of his children about four years old. After traversing his pastures for a while, attended by his dog, he was compelled to ascend a summit at some distance. As the ascent was too great for the child, he left him at the bottom, with strict injunctions not to move from the place. Scarcely, however, had he gained the height, when one of the Scotch mists, of frequent occurrence, suddenly came on, and almost changed the day to night. He returned to seek his child, but was unable to find him, and concluded a long and fruitless search by coming distracted to his cottage. His poor dog also was missing in the general confusion. On the next morning by daylight he renewed his search, but again he came back without his child. He found, however, that during his absence his dog had been home, and, on receiving his allowance of food, instantly departed. For four successive days the shepherd continued his search with the same bad fortune, the dog as readily coming for his meal and departing. Struck by this singular circumstance, he determined to follow the dog, who departed as usual with his piece of cake. The animal led the way to a cataract, at some distance from the spot where the child had been left. It was a rugged and almost perpendicular descent which the dog took, and he disappeared in a cave, the mouth of which was almost on a level with the torrent. The shepherd with difficulty followed; but, on entering the cavern, what were his emotions when he beheld the infant eating the cake which the dog had just brought to him, while the faithful animal stood by, eyeing his young charge with the utmost complacency. From the situation in which the child was found, it appeared that he had wandered to the brink of the precipice, and then either fallen or scrambled down, the torrent preventing his re-ascent. The dog by means of his scent had traced him to the spot, and afterwards prevented him from starving by giving up a part, or perhaps the whole, of his own daily allowance. He appears never to have quitted the child night or day,

except for food, as he was seen running at full speed to and from the cottage.*

Mr. Hogg says, and very truly, that a single shepherd and his dog will accomplish more in gathering a flock of sheep from a Highland farm than twenty shepherds could do without dogs; in fact, that without this docile animal, the pastoral life would be a mere blank. It would require more hands to manage a flock of sheep, gather them from the hills, force them into houses and folds, and drive them to markets, than the profits of the whole flock would be capable of maintaining. Well may the shepherd feel an interest in his dog; he it is indeed that earns the family bread, of which he is himself content with the smallest morsel: always grateful, and always ready to exert his utmost abilities in his master's interests. Neither hunger, fatigue, nor the worst of treatment will drive him from his side, and he will follow him through every hardship without murmur or repining. If one of them is obliged to change masters, it is sometimes long before he will acknowledge the new owner, or condescend to work for him with the willingness that he did for his former lord; but, if he once acknowledges him, he continues attached to him until death.†

We will add another story of the colley, and proceed. It illustrates the memory of the dog. A shepherd was employed in bringing up some mountain sheep from Westmoreland, and took with him a young sheep-dog who had never made the journey before. From his assistant being ignorant of the ground, he experienced great difficulty in having the flock stopped at the various roads and lanes he passed in their way to the neighbourhood of London.

In the next year the same shepherd, accompanied by the same dog, brought up another flock for the gentleman who had had the former one. On being questioned how he had got on, he said much better than the year before, as his dog now knew the road, and had kept the sheep from going up any of the lanes or turnings that had given the shepherd so much trouble on his former journey. The distance could not have been less than 400 miles.‡

Buffon gives an eloquent and faithful account of the sheep-dog:—"This animal, faithful to man, will always preserve a portion of his empire and a degree of superiority over other beings. He reigns at the head of his flock, and makes himself better understood than the voice of the shepherd. Safety, order, and discipline, are the fruits of his vigilance

* Annals of Sporting, vol. viii. p. 83.

† "The Ettrick Shepherd has probably spoken somewhat too enthusiastically of his dog; but accounts of the sagacity and almost superhuman fidelity of this dog crowd so rapidly upon us, that we are compelled to admire and to love him."—Hogg's Shepherd's Calendar, vol. ii. p. 308.

‡ Jesse's Gleanings, vol. i. p. 93.

and activity. They are a people submitted to his management, whom he conducts and protects, and against whom he never employs force but for the preservation of good order." "If we consider that this animal, notwithstanding his ugliness and his wild and melancholy look, is superior in instinct to all others; that he has a decided character in which education has comparatively little share; that he is the only animal born perfectly trained for the service of others; that, guided by natural powers alone, he applies himself to the care of our flocks, a duty which he executes with singular assiduity, vigilance, and fidelity; that he conducts them with an admirable intelligence which is a part and portion of himself; that his sagacity astonishes at the same time that it gives repose to his master, while it requires great time and trouble to instruct other dogs for the purposes to which they are destined: if we reflect on these facts we shall be confirmed in the opinion that the shepherd's dog is the true dog of nature, the stock and model of the whole species."*

THE DROVER'S DOG

bears considerable resemblance to the sheep-dog, and has usually the same prevailing black or brown colour. He possesses all the docility of the sheep-dog, with more courage, and sometimes a degree of ferocity, exercised without just cause upon his charge, while he is in his turn cruelly used by a brutal master.

There is a valuable cross between the colley and the drover's dog in Westmoreland, and a larger and stronger breed is cultivated in Lincolnshire; indeed it is necessary there, where oxen as well as sheep are usually consigned to the dog's care. A good drover's dog is worth a considerable sum; but the breed is too frequently and injudiciously crossed at the fancy of the owner. Some drover's dogs are as much like setters, lurchers, and hounds, as they are to the original breed.

Stories are told of the docility and sagacity of the drover's dog even more surprising than any that are related of the sheep-dog. The Ettrick Shepherd says, that a Mr. Steel, butcher in Peebles, had such implicit dependence on the attention of his dog to his orders, that whenever he put a lot of sheep before her, he took a pride in leaving them entirely to her, and either remained to take a glass with the farmer of whom he had made the purchase, or travelled another road to look after bargains or business. At one time, however, he chanced to commit a drove to her charge, at a place called Willenslee, without attending to her condition, which he certainly ought to have done. This farm is about five miles from Peebles, over wild hills, and there is no regularly defined path to it. Whether Mr. Steel

chose another road is uncertain; but, on coming home late in the evening, he was surprised to hear that his faithful animal had not made her appearance with her flock. He and his son instantly prepared to set out by different paths in search of her; but, on going into the street, there was she with the flock, and not one of the sheep missing; she, however, was carrying a young pup in her mouth. She had been taken in travail on those hills; and how the poor beast had contrived to manage the sheep in her state of suffering is beyond human calculation, for her road lay through sheep-pastures the whole way. Her master's heart smote him when he saw what she had suffered and effected; but she was nothing daunted; and, having deposited her young one in a place of safety, she again set out at full speed to the hills, and brought another and another little one, until she had removed her whole litter one by one: the last, however, was dead.

Mr. Blaine relates as extraordinary an instance of intelligence, but not mingled, like the former, with natural affection. A butcher and cattle-dealer, who resided about nine miles from Alston, in Cumberland, bought a dog of a drover. The butcher was accustomed to purchase sheep and kine in the vicinity, which, when fattened, he drove to Alston market and sold. In these excursions he was frequently astonished at the peculiar sagacity of his dog, and at the more than common readiness and dexterity with which he managed the cattle; until at length he troubled himself very little about the matter, but, riding carelessly along, used to amuse himself with observing how adroitly the dog acquitted himself of his charge. At length, so convinced was he of his sagacity, as well as fidelity, that he laid a wager that he would intrust the dog with a number of sheep and oxen, and let him drive them alone and unattended to Alston market. It was stipulated that no one should be within sight or hearing who had the least control over the dog, nor was any spectator to interfere. This extraordinary animal, however, proceeded with his business in the most steady and dexterous manner; and, although he had frequently to drive his charge through other herds that were grazing, he did not lose one; but, conducting them to the very yard to which he was used to drive them when with his master, he significantly delivered them up to the person appointed to receive them by barking at his door. When the path which he travelled lay through grounds in which others were grazing, he would run forward, stop his own drove, and then, chasing the others away, collect his scattered charge, and proceed.

THE ITALIAN OR POMERANIAN WOLF-DOG.

The wolf-dog is no longer a native of Great Britain, because his services are not required there,

* Buffon's Natural History, vol. v. p. 314.

but he is useful in various parts of the continent, in the protection of the sheep from the attacks of the wolf. A pair of these dogs was brought to the Zoological Society of London in 1833, and there long remained, an ornament to the Gardens. They appeared to possess a considerable degree of strength, but to be too gentle to contend with so powerful and ferocious an animal as the wolf. They were mostly covered with white or gray, or occasionally black hair, short on the head, ears, and feet, but long and silky on the body and tail. The forehead is elevated, and the muzzle lengthened and clothed with short hair. The attachment of this dog to his master and the flock is very great, and he has not lost a particle of his sagacity, but, where wolves are common, is still used as a sheep-dog.

THE CUR

is the sheep-dog crossed with the terrier. He has long and somewhat deservedly obtained a very bad name, as a bully and a coward; and certainly his habit of barking at everything that passes, and flying at the heels of the horse, renders him often a very dangerous nuisance: he is, however, in a manner necessary to the cottager; he is a faithful defender of his humble dwelling; no bribe can seduce him from his duty; and he is likewise a useful and an effectual guard over the clothes and scanty provisions of the labourer, who may be working in some distant part of the field. All day long he will lie upon his master's clothes, seemingly asleep, but giving immediate warning of the approach of a supposed marauder. He has a propensity, when at home, to fly at every horse and every strange dog; and of young game of every kind there is no more ruthless destroyer than the village cur.

Mr. Hogg draws the following curious parallel between the sheep-dog and the cur:—"An exceedingly good sheep-dog attends to nothing but the particular branch of business to which he is bred. His whole capacity is exerted and exhausted in it; and he is of little avail in miscellaneous matters; whereas a very indifferent cur bred about the house, and accustomed to assist in everything, will often put the more noble breed to disgrace in these little services. If some one calls out that the cows are in the corn, or the hens in the garden, the house colley needs no other hint, but runs and turns them out. The shepherd's dog knows not what is astir, and if he is called out in a hurry for such work, all that he will do is to run to the hill, or rear himself on his haunches to see that no sheep are running away. A well-bred sheep-dog, if coming hungry from the hills, and getting into a milk-house, would likely think of nothing else than filling his belly with the cream. Not so his initiated brother: he is bred at home

to far higher principles of honour. I have known such lie night and day among from ten to twenty pails full of milk, and never once break the cream of one of them with the tip of his tongue, nor would he suffer cat, rat, or any other creature to touch it. While therefore the cur is a nuisance, he is very useful in his way, and we would further plead for him, that he possesses a great deal of the sagacity and all the fidelity of the choicest breed of dogs."

The dog who, according to the well-known and authentic story, watched the remains of his master for two years in the churchyard of St. Olave's, in Southwark, was a cur.

The following story is strictly authentic:—"Not long ago a young man, an acquaintance of the coachman, was walking, as he had often done, in Lord Fife's stables at Banff. Taking an opportunity, when the servants were not regarding him, he put a bridle into his pocket. A Highland cur that was generally about the stables saw him, and immediately began to bark at him, and when he got to the stable-door would not let him pass, but bit him by the leg in order to prevent him. As the servants had never seen the dog act thus before, and the same young man had been often with them, they could not imagine what could be the reason of the dog's conduct. However, when they saw the end of a valuable bridle peeping out of the young man's pocket, they were able to account for it, and, on his giving it up, the dog left the stable-door where he had stood, and allowed him to pass."*

THE LURCHER.

This dog was originally a cross between the greyhound and the shepherd's dog, retaining all the speed and fondness for the chase belonging to the one, and the superior intelligence and readiness for any kind of work which the latter possessed. This breed has been crossed again with the spaniel, combining the disposition to quest for game which distinguishes the spaniel with the muteness and swiftness of the greyhound. Sometimes the greyhound is crossed with the hound. Whatever be the cross, the greyhound must predominate; but his form, although still to be traced, has lost all its beauty.

The lurcher is a dog seldom found in the possession of the honourable sportsman. The farmer may breed him for his general usefulness, for driving his cattle, and guarding his premises, and occasionally coursing the hare; but other dogs will answer the former purposes much better, while the latter qualification may render him suspected by his landlord, and sometimes be productive of serious injury. In a rabbit-warren

* Travels in Scotland, by the Rev. J. Hall, vol. ii. p. 395.

this dog is peculiarly destructive. His scent enables him to follow them silently and swiftly. He darts unexpectedly upon them, and being trained to bring his prey to his master, one of these dogs will often in one night supply the poacher with rabbits and other game worth more money than he could earn by two days' hard labour.

Mr. H. Faull, of Helstone, in Cornwall, lost no fewer than fifteen fine sheep, and some of them store sheep, killed by lurchers in January, 1824.*

We now proceed to the different species of dog belonging to the second division of Cuvier, which are classed under the name of Hound; and first we take

THE BEAGLE.

The origin of this diminutive hound is somewhat obscure. There is evidently much of the harrier and of the old southern, connected with a considerable decrease of size and speed, the possession of an exceedingly musical voice, and very

great power of scent. Beagles are rarely more than ten or twelve inches in height, and were generally so nearly of the same size and power of speed, that it was commonly said they might be covered with a sheet. This close running is, however, considered as a mark of excellence in hounds of every kind.

There are many pleasurable recollections of the period when "the good old English gentleman" used to keep his pack of beagles or little harriers, slow but sure, occasionally carried to the field in a pair of panniers on a horse's back; often an object of ridicule at an early period of the chase, but rarely failing to accomplish their object ere the day closed, "the puzzling pack unravelling wile by wile, maze within maze." It was often the work of two or three hours to accomplish this; but it was seldom, in spite of her speed, her shifts, and her doublings, that the hare did not fall a victim to her pursuers.

The slowness of their pace gradually caused them to be almost totally discontinued, until very lately, and especially in the royal park at Windsor, they have been again introduced. Generally



THE BEAGLE.

speaking, they have all the strength and endurance which is necessary to ensure their killing their game, and are much fleetier than their diminutive size would indicate. Formerly, considerable fancy and even judgment used to be exercised in the breeding of these dogs. They were curiously distinguished by the names of "deep-flewed," or "shallow-flewed," in proportion as they had the depending upper lip of the southern, or the sharper

muzzle and more contracted lip of the northern dogs. The shallow-flewed were the swiftest, and the deep-flewed the stoutest and the surest, and their music the most pleasant. The wire-haired beagle was considered as the stouter and better dog.

The form of the head in beagles has been much misunderstood. They have, or should have, large heads, decidedly round, and thick rather than long; there will then be room for the expansion of the

* Annals of Sporting, vol. v. p. 137.

nasal membrane—that of smell—and for the reverberation of the sound, so peculiarly pleasant in this dog.

The beagle runs very low to the ground, and therefore has a stronger impression of the scent than taller dogs. This is especially the case when the scent is more than usually low.

Among the advocates for beagles, several years ago, was Colonel Hardy. He used to send his dogs in panniers, and they had a little barn for their kennel. The door was one night broken open, and every hound, panniers and all, stolen. The thief was never discovered, nor even suspected.

The use of beagles was soon afterwards nearly abandoned by the introduction of the harrier, and by his yielding in his turn to the fox-hound; but the beagles of Colonel Thornton and Colonel Molyneux will not be soon forgotten.*

There is, however, a practice which fair sportsmen will never resort to—the use of a beagle to start a hare in order to be run down by a brace of greyhounds, or perhaps by a lurcher. The hare is not fairly matched in this way of proceeding.

THE HARRIER

occupies an intermediate station between the beagle and the fox-hound. It is the fox-hound bred down to a diminished size, and suited to the animal he is to pursue. He retains, or did for a while retain, the long body, deep chest, large bones, somewhat heavy head, sweeping ears, and mellow voice, which the sportsman of old so enthusiastically described, with the certainty of killing, and the pleasing prolongation of the chase. With this the farmer used to be content: it did not require expensive cattle, was not attended with much hazard of neck, and did not take him far from home.

Almost every country squire used in former days to keep his little pack of harriers or beagles. He was mounted on his stout cob-horse, that served him alike for the road and the chace; and his huntsman probably had a still smaller and rougher beast, or sometimes ran afoot. He could then follow the sport, almost without going off his own land, and the farmer's boys, knowing the country and the usual doublings of the hare, could see the greater part of the chace, and were almost

able to keep up with the hounds, so that they were rarely absent at the death: indeed they saw and enjoyed far more of it than the fox-hunter or the stag-hunter now does, mounted on his fleetest horse.

The harrier was not more than 18 or 19 inches high. He was crossed with the fox-hound if he was getting too diminutive, or with the beagle if he was becoming too tall.

The principal objects the sportsman endeavoured to accomplish were to preserve stoutness, scent, and musical voice, with speed to follow the hare sufficiently close, yet not enough to run her down too quickly, or without some of those perplexities, and faults, and uncertainties which give the principal zest to the chace.

The character and speed of the hound much depend on the nature of the country. The smaller harrier will best suit a deeply enclosed country; but where there is little cover, and less doubling, greater size and fleetness are requisite. The harrier, nevertheless, let him be as tall and as speedy as he may, should never be used for the fox; but every dog should be strictly confined to his own game.

Mr. Beckford, in his *Thoughts upon Hunting*, gives an account, unrivalled, of the chace of the hare and fox. Many sporting writers have endeavoured to tread in his steps; but they have failed in giving that graphic account of the pleasures of the field which Mr. Beckford's essay contains.

He says that the sportsman should never have more than 20 couple in the field, because it would be exceedingly difficult to get a greater number to run together, and a pack of harriers cannot be complete if they do not. A hound that runs too fast for the rest, or that lags behind them, should be immediately discarded. His hounds were between the large slow-hunting harrier and the fox-beagle. He endeavoured to get as much bone and strength in as little compass as possible. He acknowledges that this was a difficult undertaking; but he had, at last, the pleasure to see them handsome, small, yet bony, running well together, and fast enough, with all the alacrity that could be desired, and hunting the coldest scent.

He anticipates the present improvement of the chace when he lays it down as a rule never to be departed from, that hounds of every kind should be kept to their own game. They should have one scent, and one style of hunting. Harriers will run a fox in so different a style from the pursuit of a hare, that they will not readily, and often will not at all, return to their proper work. The difference in the scent, and the eagerness of pursuit, and the noise that accompanies fox-hunting all contribute to spoil a harrier.

Mr. Beckford pleasingly expresses a sports-

* Mr. Beckford at one time determined to try how he should like the use of beagles, and, having heard of a small pack of them, he sent his coachman, the person he could best spare, to fetch them. It was a long journey, and, although he had some assistance, yet not being used to hounds, he had some trouble in getting them along, especially as they had not been out of the kennel for several weeks before. They were consequently so riotous that they ran after everything they saw, sheep, cur dogs, birds of all sorts, as well as hares and deer. However, he lost but one hound; and, when Mr. Beckford asked him what he thought of them, he said, that they could not fail of being good hounds, for they would hunt everything.



THE HARRIER.

man's consideration for the poor animal which he is hunting to death. "A hare," he says, "is a timorous little animal that we cannot help feeling some compassion for at the time that we are pursuing her destruction. We should give scope to all her little tricks, nor kill her foully nor over-matched. Instinct instructs her to make a good defence when not unfairly treated, and I will venture to say that, as far as her own safety is concerned, she has more cunning than the fox, and makes shifts to save her life far beyond all his artifice."*

THE FOX-HOUND

is of a middle size, between the harrier and the stag-hound; it is the old English hound, sufficiently crossed with the greyhound to give him lightness and speed without impairing his scent; and he has now been bred to a degree of speed sufficient to satisfy the man who holds his neck at the least possible price, and with which few, except thorough-bred horses, and not all of them, can live to the end of the chace. The fox-hound is lighter, or, as it is now called, more highly bred, or he retains a greater portion of his original size and heaviness, according to the nature of the country and the fancy of the master of the pack: therefore it is difficult to give an accurate description of the best variety of this dog; but there are guiding

points which can never be forgotten without serious injury.

He derives from the greyhound a head somewhat smaller and longer in proportion to his size than either the stag-hound or the harrier. But considerable caution is requisite here. The beauty of the head and face, although usually accompanied by speed, must never be sacrificed to stoutness and power of scent. The object of the sportsman is to amalgamate them, or rather to possess them all in the greatest possible degree. This will generally be brought to a great degree of perfection if the sportsman regards the general excellence of the dog rather than the perfection of any particular point. The ears should not, comparatively speaking, be so large as those of the stag-hound or the harrier; but the neck should be longer and lighter, the chest deep and capacious, the fore-legs straight as arrows, and the hind ones well bent at the hock.

Some extraordinary accounts have been given of the speed of the fox-hound. A match that was run over the Beacon Course, at Newmarket, is the best illustration of his fleetness. The distance is 4 miles 1 furlong and 132 yards. The winning dog performed it in 8 minutes and a few seconds; but of the sixty horses that started with the hounds only twelve were able to run in with them. Flying Childers had run the same course in 7 minutes and 30 seconds.

* Beckford on Hunting, p. 150.

"The size, or, as we should rather say, the height of a fox-hound, is a point on which there has been much difference of opinion. Mr. Chute's pack was three inches below the standard of Mr. Villebois', and four inches below that of Mr. Warde's. The advocates of the former assert, that they get better across a deep and strongly fenced country, while the admirers of the latter insist on their being better climbers of hills and more active in cover. As to uniformity in size, it is by no means essential to the well-doing of hounds in the field, and has been disregarded by some of our best sportsmen: Mr. Meynell never

drafted a good hound on account of his being over or under sized. The proper standard of height in fox-hounds is from 21 to 22 inches for bitches, and from 23 to 24 for dog-hounds. Mr. Warde's bitches, the best of the kind that our country contained, were rather more than 23 inches. A few of his dogs were 25 inches high. The amount of hounds annually bred will depend upon the strength of the kennel. From sixty to eighty couples is the complement for a four days a-week pack, which will require the breeding of a hundred couples of puppies every year, allowing for accidents and distemper."*



THE FOX-HOUND.

Nimrod very properly observes, that "Mr. Beckford has omitted a point much thought of by the modern sportsmen, namely, *the back-ribs*, which should also be deep, as in a strong-bodied horse, of which we say, when so formed, that he has a good 'spur-place'; a point highly esteemed in him. Nor is he sufficiently descriptive of the hinder legs of the hound; for there is a length of thigh discernible in first-rate hounds which, like the well-let-down hock of the horse, gives them much superiority of speed, and is also a great security against their laming themselves in leaping fences, which they are more apt to do when they become blown, and consequently weak. The fore-legs, 'straight as arrows,' is an admirable illustration of perfection in those parts by Beckford; for, as in a bow or bandy legged man, nothing is

so disfiguring to a hound as having his elbows projecting, and which is likewise a great check to speed."†

Mr. Daniel gives a curious account of the prejudices of sportsmen on the subject of colour. The white dogs were curious hunters, and had a capital scent; the black, with some white spots, were obedient, good hunters, and with good constitutions; the gray-coloured had no very acute scent, but were obstinate and indefatigable in their quest; the yellow dogs were impatient and obstinate, and taught with difficulty.‡

The dog exhibits no criteria of age after the first two years. That period having elapsed, the

* The Horse and the Hound, by Nimrod, p. 340.

† Ibid., p. 332.

‡ Daniel's Fox-hound, p. 205.

whiteness and evenness of the teeth soon pass away, and the *old* dog can scarcely be mistaken. Nimrod scarcely speaks too positively when he says that an old hound cannot be mistaken, if only looked in the face. At all events, few are found in a kennel after the eighth year, and very few after the ninth.

Mr. Beckford advises the sportsman carefully to consider the size, shape, colour, constitution, and natural disposition of the dog from which he breeds, and also the fineness of the nose, the evident strength of the limb, and the good temper and devotion to his master which he displays. The faults or imperfections in one breed may be rectified in another: and, if this is properly attended to, there is no reason why improvements may not continually be made.

The separation of the sexes in the kennel and in the field is one of the latest innovations in the hunting world, and generally considered to be a good one. The eye is pleased to see a pack of hounds, nearly or quite of a size. The character of the animal is more uniformly displayed when confined to one sex. In consequence of the separation of the two, the dogs are less inclined to quarrel; and the bitches are more at their ease than when undergoing the importunate solicitations of the male. As to their performances in the field, opinions vary, and each sex has its advocates. The bitch, with a good fox before her, is decidedly more off-hand at her work; but she is less patient, and sometimes overruns the scent. Sir Bellingham Graham has been frequently heard to say, that if his kennels would have afforded it, he would never have taken a dog-hound into the field. That in the canine race the female has more of elegance and symmetry of form, consequently more of speed, than the male, is evident to a common observer; but there is nothing to lead to the conclusion that, in the natural endowments of the senses, any superiority exists.*

The bitch should not be allowed to engage in any long and severe chace after she has been lined. She should be kept as quiet as may be practicable, and well, but not too abundantly fed; each having a kennel or place of retreat for herself. She should be carefully watched, and especially when the ninth week approaches. The huntsman and the keeper, without any apparent or unnecessary intrusion, should be on the alert.

The time of pupping having arrived, as little noise or disturbance should be made as possible; but a keeper should be always at hand, in case of abortion or difficult parturition. Should there be a probability of either of these occurring, he should not be in a hurry; for, as much should be left to nature as can, without evident danger, be done,

and the keeper should rarely intrude unless his assistance is indispensable.

The pupping being accomplished, the mother should be carefully attended to. She should be liberally fed, and particularly should have her share of animal food, and an increased quantity of milk.

The bitch should not have whelps until she has hunted two seasons; for, before that time it will be scarcely possible to ascertain her excellences or defects. If there are any considerable faults, she should be immediately rejected.

When the time approaches for her to produce her puppies, she should be allowed a certain degree of liberty, and should choose her couch and run about a little more than usual; but, when the young ones are born, the less they are handled the better. The constitution and appearance of the mother will indicate how many should be kept. If two litters are born at or about the same time, or within two or three days of each other, we may interchange one or two of the whelps of each of them, and perhaps increase the value of both.

When the whelps are able to crawl to a certain distance, it will be time to mark them, according to their respective litters, some on the ear and others on the lip. The dew-claws should be removed, and, usually, a small tip from the tail. Their names also should be recorded.

The whelps will begin to lap very soon after they can look about them, and should remain with the mother until they are fully able to take care of themselves. They may then be prepared to go to quarters.

Two or three doses of physic should be given to the mother, with intervals of four or five days between each: this will prepare her to return to the kennel.

There is often considerable difficulty in disposing of the whelps until they get old and stout enough to be brought into the kennel. They are mostly sent to some of the neighbouring cottages, in order to be taken care of; but they are often neglected and half starved there. In consequence of this, distemper soon appears, and many of them are lost.

Whelps *walked*, or taken care of at butchers' houses, soon grow to a considerable size; but they are apt to be heavy-shouldered and throaty, and perhaps otherwise deformed. There is some doubt whether it might not be better for the sportsman to take the management of them himself, and to have a kennel built purposely for them. It may, perhaps, be feared that the distemper will get among them: they would, however, be well fed, and far more comfortable than they now are; and, as to the distemper, it is a disease that they must have some time or other.

From twenty to thirty couples are quite as many as can be easily managed; and the principal

* The Horse and the Hound, by Nimrod, p. 355.

consideration is, whether they are steady, and as nearly as possible possessing equal speed. When the packs are very large, the hounds are seldom sufficiently hunted to be good. Few persons choose to hunt every day, or, if they did, it is not likely that the weather would permit them. The sportsman would, therefore, be compelled to take an inconvenient number into the field, and too many must be left behind. In the first place, too many hounds in the field would frequently spoil the sport; and, on the other hand, the hounds that remained would get out of wind, or become riotous, or both. Hounds, to be useful and good, should be constantly hunted; but a great fault in many packs is their having too many old dogs among them.

Young hounds, when first taken to the kennel, should be kept separate from the rest of the pack, otherwise there will be frequent and dangerous quarrels. When these do occur, the feeder hears, and sometimes, but not so frequently as he ought, endeavours to discover the cause of the disturbance, and visits the culprits with deserved punishment; too often, however, he does not give himself time for this, but rushes among them, and flogs every hound that he can get at, guilty or not guilty. This is a shameful method of procedure. It is the cause of much undeserved punishment: it spoils the temper of the dog, and makes him careless and indifferent as long as he lives.

Mr. Beckford very properly remarks, that "Young hounds are, and must be awkward at first, and should be taken out, a few at a time, with couples not too loose. They are thus accustomed to the usual occurrences of the road, and this is most easily accomplished when a young and an old dog are coupled together."

A sheep-field is the next object, and the young hound, properly watched, soon becomes reconciled, and goes quietly along with the companion of the preceding day. A few days afterwards the dogs are uncoupled in the field, and perhaps, at first, are not a little disposed to attack the sheep; but the cry of "Ware sheep!" in a stern tone of voice, arrests them, and often without the aid of the whip; it being taken as a principle that this instrument should be used as seldom as possible. If, indeed, the dog is self-willed, the whip must be had recourse to, and perhaps with some severity; for, if he is once suffered to taste the blood of the sheep it may be difficult to restrain him afterwards. A nobleman was told that it was possible to break his dogs of the habit of attacking his sheep, by introducing a large and fearless ram among them; one was accordingly procured and turned into the kennel. The men with their whips and voices, and the ram with his horns, soon threw the whole kennel into confusion. The hounds and the ram were left together. Meeting a friend soon afterwards, "Come," said he, "to the kennel, and see

what rare sport the ram is making among the hounds." His friend asked whether he was not afraid that some of them might be spoiled. "No," said he; "they deserve it, and let them suffer." They proceeded to the kennel; all was quiet. The kennel-door was thrown open, and the remains of the ram were found scattered about; the hounds, having filled their bellies, had retired to rest.

The time of entering young hounds must vary in different countries. In a corn country, it should not be until the wheat is carried; in grass countries, somewhat sooner; and, in woodlands, as soon as we please. Frequent hallooing may be of use with young hounds; it makes them more eager; but, generally speaking, there is a time when it may be of use, a time when it does harm, and a time when it is perfectly indifferent.

The following remarks from Mr. Beckford are worthy of their author:—"Hounds at their first entering cannot be encouraged too much. When they begin to know what is right, it will be soon enough to chastise them for doing wrong; and, in such case, one rather severe beating will save a great deal of trouble. The voice should be used as well as the whip; and the smack of the whip will often be of as much avail as the lash to him who has felt it."

Flogging hounds in the kennel, the frequent practice of too many huntsmen, should be held in utter abhorrence; and, if carried to a considerable excess, is a disgrace to humanity. Generally speaking, none but the sportsman can form an adequate conception of the perfect obedience of the hound both in the kennel and the field. At feeding-time, each dog, although hungry enough, will go through the gate in the precise order in which he is called by the feeder; and, in a well-broken pack, to chop at, or to follow a hare, or to give tongue on a false scent, or even to break cover alone, although the fox is in view, are faults that are rarely witnessed.

Let not this obedience, however, be purchased by the infliction of a degree of cruelty that disgraces both the master and the menial. A young fox-hound may, possibly, mistake the scent of a hare for that of a fox, and give tongue. In too many hunts he will be unmercifully flogged for this, and some have almost died under the lash. Mercy is a word totally unknown to a great proportion of whippers-in, and even to many who call themselves gentlemen. There can be no occasion or excuse for barbarity: a little trouble, and moderate punishment, and the example of his fellows, will gradually teach the wildest hound his duty.

That the huntsman, and not the hound, may occasionally be in fault, the following anecdote will furnish sufficient proof. In drawing a strong cover, a young bitch gave tongue very freely, while none of the other hounds challenged. The whip-

per-in railed to no purpose; the huntsman insisted that she was wrong, and the whip was applied with great severity. In doing this, the lash accidentally struck one of her eyes out of its socket.

Notwithstanding the dreadful pain that must have ensued, she again took up the scent, and proved herself right; for the fox had stolen away, and she had broken cover after him, unheeded and alone. After much delay and cold hunting, the pack hit off the same scent.

At some distance a farmer informed the sportsmen that they were a long way behind the fox, for he had seen a single hound, very bloody about the head, running breast-high, so that there was but little chance of their getting up with her. The pack, from her coming to a check, did at length overtake her.

The same bitch once more hit off the scent, and the fox was killed, after a long and severe run. The eye of the poor animal, that had hung pendent through the chace, was then taken off with a pair of scissors.

THE COMMENCEMENT OF THE SEASON.

During the beginning of autumn, the hounds should be daily exercised when the weather will permit. They should often be called over in the kennel to habituate them to their names, and walked out among the sheep and deer, in order that they may be accustomed perfectly to disregard them.

A few stout hounds being added to the young ones, some young foxes may occasionally be turned out. If they hunt improper game, they must be sternly checked. Implicit obedience is required until they have been sufficiently taught as to the game which they are to pursue. No obstinate deviation from it must ever be pardoned. The hounds should be, as much as possible, taken out into the country which they are afterwards to hunt, and some young foxes are probably turned out for them to pursue. At length they are suffered to hunt their game in thorough earnest, and to taste of its blood.

After this they are sent to more distant covers, and more old hounds are added, and so they continue until they are taken into the pack, which usually happens in September. The young hounds continue to be added, two or three couple at a time, until all have hunted. They are then divided into two packs, to be taken out on alternate days. Properly speaking, the sport cannot be said to begin until October, but the two preceding months are important and busy ones.*

"It would appear, then," says Nimrod, "that the breeding of a pack of fox-hounds, bordering on perfection, is a task of no ordinary difficulty. The best proof of it is to be found in the few

sportsmen that have succeeded in it. Not only is every good quality obtained, if possible, but every imperfection or fault is avoided. The highest virtue in a fox-hound is his being true to the line his game has gone, and a stout runner at the end of the chace. He must also be a patient hunter when there is a cold scent and the pack is at fault."

While there is no country in the world that can produce a breed of horses to equal the English thorough-bred in his present improved state, there are no dogs like the English fox-hound for speed, scent, and continuance. It would seem as if there were something in the climate favourable and necessary to the perfection of the hound. Packs of them have been sent to other countries, neighbouring and remote, but they have usually become more or less valueless.

As regards the employment of the voice and the horn when out with hounds, too much caution cannot be used. A hound should never be cheered unless we are perfectly convinced that he is right, nor rated unless we are sure that he is wrong. When we are not sure of what is going on we should sit still and be silent. A few moments will possibly put us in possession of all that we wish to know.†

The horn should only be used on particular occasions, and a huntsman should speak by his horn as much as by his voice. Particular notes should mean certain things, and the hounds and the field should understand the language. We have heard some persons blowing the horn all the day long, and the hounds have become so careless as to render it of no use. When a hound first speaks in cover to a fox, you may, if you think it necessary, use *one single* and prolonged note to get the pack together. The same note will do at any time to call up a lost or loitering hound; but, when the fox breaks cover, then let your horn be marked in its notes: let it sound as if you said through it, "Gone away! gone away! gone away! away! away! away!" dwelling with full emphasis on the last syllable. Every hound will fly from the cover the moment he hears this, and the sportsmen and the field will know that the fox is away.

It is the perfection of the horse, and the perfection of the hound, and the disregard of trifling expense, that has given to Englishmen a partiality

* Mr. Beckford gives the following excellent account of what a huntsman should be:—"A huntsman should be attached to the sport, and indefatigable, young, strong, active, bold, and enterprising in the pursuit of it. He should be sensible, good-tempered, sober, exact, and cleanly—a good groom, and an excellent horseman. His voice should be strong and clear, with an eye so quick as to perceive which of his hounds carries the scent when all are running, and an ear so excellent as to distinguish the leading hounds when he does not see them. He should be quiet, patient, and without conceit. Such are the qualities which constitute perfection in a huntsman. He should not, however, be too fond of displaying them until called forth by necessity; it being a peculiar and distinguishing trait in his character to let his hounds alone while they thus hunt, and have genius to assist them when they cannot."—Beckford on Hunting, Letter ix.

* Beckford's Thoughts on Hunting, p. 95.

for field-sports, unequalled in any other country. Mr. Ware's pack of fox-hounds cost 2000 guineas, and the late Lord Middleton gave the same to Mr. Osbaldeston for ten couples of his hounds.

HUNTING-KENNELS.

It is time, however, to speak of the kennel, whether we regard the sporting architecture of Mr. G. Tattersall, or the scientific inquiries of Mr. Vyner, or a sketch of the noble buildings at Goodwood.

The lodging-rooms should be ceiled, but not plastered, with ventilators above and a large airy window on either side. The floors should be laid with flags or paved with bricks. Cement may be used instead of mortar, and the kennels will then be found wholesome and dry. The doorways of the lodging-houses will generally be four feet and a half wide in the clear. The posts are rounded, to prevent the hounds from being injured when they rush out. The benches may be made of cast iron or wood; those composed of iron being most durable, but the hounds are more frequently lamed in getting to them. The wooden benches must be bound with iron, or the hounds will gnaw or destroy them. A question has arisen whether the benches should be placed round the kennel, or be in the centre of it, allowing a free passage by the side. There is least danger of the latter being affected by the damp. The walls should be wainscoted to the height of three feet at least. This will tend very considerably to their comfort.

The floors of all the courts should be arranged in nearly the same way; the partition walls being closed at the bottom, but with some iron-work above. The doorways should also be so contrived, that the huntsman may be able to enter whenever he pleases. The boiling-house should be at as great a distance from the hunting-kennel as can be managed, continuing to give warmth to the infirmary for distempered puppies, and at the same time being out of the way of the other courts.

Mr. Vyner gives an interesting account of the young hound's kennel:—"This building," he says, "should be as far from the other lodging-rooms as the arrangements of the structure will allow. There is also an additional court, or grass-yard, an indispensable requisite in the puppies' kennel. The size must be regulated according to the waste land at the end of the building; but the longer it is, the better. At the farther end of the grass-court is a hospital for such young hounds as are distempered, so contrived as to be remote from the other kennels, and, at the same time, within an easy distance of the boiling-house, whence it is apparently approached by an outside door, through which the feeder can constantly pass to attend to the sick hounds' without disturbing the healthy lots. Although this lodging-room is warmed by

the chimneys of the boiling-house, it must also be well ventilated by two windows, to which shutters must be attached; ventilation and good air being quite as necessary to the cure of distemper as warmth."

KENNEL LAMENESS.

We now proceed to a most important and ill-understood subject—the nature and treatment of *kennel lameness*. It is a subject that nearly concerns the sportsman, and on which there are several and the most contrary opinions.

This is a kind of lameness connected with, or attributable to, the kennel. According to the early opinion of Mr. Asheton Smith, who is a good authority, it was referrible to some peculiarity in the breed or management of the hounds; but, agreeably to a later opinion, it is dependent on situation and subsoil, and may be aggravated or increased by circumstances over which we have no control. Some kennels are in low and damp situations, yet the hounds are free from all complaint; and others, with the stanchest dogs and under the best management, are continually sinking under kennel lameness.

Mr. R. T. Vyner was one of the first who scientifically treated on this point, and taught us that *clay is not by any means an objectionable soil to build a kennel upon*, although so many pseudo-sportsmen are frightened by the very name of it.

He enters at once into his subject. "I am thoroughly convinced," says he, "from my own experience, and, I may add, my own suffering, that the disease of kennel lameness arises only from one cause, and that is an injudicious and unfortunate selection of the spot for building. The kennel is generally built on a sandbed, or on a sandstone rock, while the healthiest grounds in England are on a stiff clay, and they are the healthiest because they are the least porous. Although this may be contrary to the opinion and prejudice of the majority of sportsmen, it is a fact that cannot be contradicted.

"Through a light and friable soil, such as sand and sandstone, a vapour, more or less dense, is continually exhaling and causing a perpetual damp, which produces that fearful rheumatism which goes by the name of kennel lameness, while the kennels that are built on a clay soil, a soil of an impervious nature, are invariably healthy.

"I could," he adds, "enumerate twenty kennels to prove the effect—the invariable effect—of the existence of the disease on the one part, and of the healthiness of the situation on the other. I turn particularly to Her Majesty's kennel at Ascot, the arches of which were laid under the very foundation stones, and yet little or no amendment has ever taken place in the healthiness and comfort of the dogs. It is necessary to select a sound and

healthy situation when about to erect a kennel, and that sound and healthy situation can be met with alone on a strong impervious clay soil. We must have no fluid oozing through the walls or the floor of the kennel, and producing damp and unhealthy vapours, such as we find in the sand-bed." With regard to this there can be no error.

Nimrod, in his excellent treatise on Kennel Lameness, asks, whether it does not appear that this disease is on the increase. He asks, "How it is that neither Beckford nor Somerville says one word that clearly applies to the disease; and no one, however learned he might be in canine pathology, has been able clearly to define the disease, much less to discover a remedy for it?"

All that Mr. Blaine says on the matter amounts only to this:—"The healthiness of the situation on which any kennel is to be built is an important consideration. It is essential that it should be both dry and airy, and it should also be warm. A damp kennel produces rheumatism in dogs, which shows itself sometimes by weakness in the loins, but more frequently by lameness in the shoulders, known under the name of kennel lameness."

Mr. Blaine illustrates this by reference to his own experience. "There is no disease, with the exception of distemper and mange, to which dogs are so liable as to a rheumatic affection of some part of the body. It presents almost as many varieties in the dog as it does in man; and it has some peculiarities observable in the dog only. Rheumatism never exists in a dog without affecting the bowels. There will be inflammation or painful torpor through the whole of the intestinal canal. It is only in some peculiar districts that this occurs; it pervades certain kennels only; and but until lately there has been little or almost no explanation of the cause of the evil."*

Nimrod took a most important view of the matter, and to him the sporting world is much indebted. "How is it," he asks, "that, in our younger days, we never heard of kennel lameness, or, indeed, of hounds being lame at all, unless from accident, or becoming shaken and infirm from not having been composed of that iron-bound material which the labours of a greyhound or a hound require? How is it that, in our younger days, masters of hounds began the season with fifty or sixty couples, and, bating the casualties, left off at the end of it equally strong in their kennels, and able, perhaps, to make a valuable draft: whereas we now hear of one-half of the dogs in certain localities being disabled by disease, and some masters of hounds compelled to be stopped in their work until their kennels are replenished?"

Washing hounds when they come home after work must be injurious to them, although it has almost become the fashion of modern times. If they are not washed at all, and we believe it to be unnecessary, yet the kennels in which the lameness has appeared should be strictly avoided. It should be on the day following, and not in the evening of a hunting day, that washing should take place.

Mr. Hodgson told Nimrod that the Quorn Pack never had a case of kennel lameness until his late huntsman took to washing his hounds after hunting, and then he often had four or five couples ill from this cause. He deprecated even their access to water in the evening after hunting, and we believe that he was quite right in so doing.

The tongue of the dog, with the aid of clean straw, is his best and safest instrument in cleansing his person; and, if he can be brought to his kennel with tolerably clean feet, as Mr. Foljambe enables him to be brought, he will never be long before he is comfortable in his bed, after his belly is filled.

There is another mode as a preventive of kennel lameness, which we have the best authority for saying deserves particular attention, and that is, the frequently turning hounds off their benches during the day, even if it were to the extent of every two hours throughout the entire day. We do not mean to deny the existence of a disease, which, being produced in the kennel, is properly termed kennel lameness. Some kennels are, no doubt, more unhealthy and prone to engender rheumatic affections than others; but, by proper management, and avoiding as much as possible all exciting causes, their effects may, at least, be very much lessened, if not entirely obviated.

LORD FITZHARDINGE'S MANAGEMENT.

Lord Fitzhardinge's opinion of the situation of the kennel and the management of the hounds, as given in the *New Sporting Magazine*, is somewhat different from that which has been just given. The following is the substance of it:*

He states that the kennel should be built on a dry and warm situation. Of this there can be no doubt: the comfort and almost the existence of the dog depend upon it. To this he adds that it must not be placed on a gravelly or porous soil, over which vapours more or less dense are frequently or continually travelling, and thus causing a destructive exhalation over the whole of the building. There must be no fluid oozing through the walls or the floor of the kennel, and producing damp and unhealthy vapours. When we have not a deep supersoil of clay, one or two layers of bricks or of stone may line the floor, and then not even the

* Blaine on the Diseases of the Dog, p. 140.

* See Hints to Young Masters of Fox-hounds—*New Sport Mag.*, vol. viii. p. 174—290.

most subtile vapour can penetrate through the floor. A clean bed of straw should be allowed every second day, or oftener when the weather is wet. The lodging-houses should be ceiled, and there should be shutters to the windows. A thatched roof is preferable to tiles, being warmer in winter and cooler in summer.

Stoves in the kennels are not necessary; probably they are best avoided; for, if dogs are accustomed to any considerable degree of artificial heat, they are more easily chilled by a long exposure to cold. Their teeth and the setting-up of their backs will confirm this.

Hounds, when they feel cold, naturally seek each other for warmth, and they may be seen lying upon the straw and licking each other, and that is by far the most wholesome way of procuring comfort and warmth.

On returning from hunting, their feet should be washed with some warm fluid, and especially the eyes should be examined, and their food got ready for them as soon as possible. The feeding in the morning should be an hour, or an hour and a half before they start for the field.

It is truly observed by the noble writer to whom we have referred, that there is no part of an establishment of this kind that merits more attention than the boiling and feeding house. The hounds cannot perform their work well unless judiciously fed. Each hound requires particular and constitutional care. No more than five of them should be let in to feed together, and often not more than one or two. The feeder should have each hound under his immediate observation, or they may get too much or too little of the food.

Some hounds cannot run if they carry much flesh; others are all the better for having plenty about them. The boilers should be of iron, two in number—one for meal and the smaller one for flesh. The large boiler should render it necessary to be used not more than once in four days or a week. The food should be stirred for two hours, then transferred to flat coolers, until sufficiently gelatinous to be cut with a kind of spade. By the admixture of some portion of soups it may be brought to any thickness requisite. The flesh to be mixed with it should be cut very small, that the greedy hounds may not be able to obtain more than their share. Four bushels and a half of genuine old oatmeal should be boiled with a hundred gallons of water. The flesh should be boiled every second or third day. Too great a proportion of soup would render the mixture of a heating nature.

Mr. Delmé Radcliffe very truly observes that the feeding of hounds, as regards their condition, is one of the most essential proofs of a huntsman's skill in the management of the kennel. To pre-

serve that even state of condition throughout the pack which is so desirable, he must be well acquainted with the appetite of every hound; for some will feed with a voracity scarcely credible, and others will require every kind of enticement to induce them to feed.

Mr. Meynell found that the use of dry unboiled oatmeal succeeded better than any other thing he had tried with delicate hounds. When once induced to take it, they would eat it greedily, and it seemed to be far more heartening than most kinds of aliment. Other hounds of delicate constitution might be tempted with a little additional flesh, and with the thickest and best of the trough, but they required to be watched, and often to be coaxed to eat.

The dog possesses the power of struggling against want of food for an almost incredible period. One of these animals, six years old, was missing three-and-twenty days; at length some children wandering in a distant wood thought that they frequently heard the baying of a dog. The master was told of it, and at the bottom of an old quarry, sixty feet deep, and the mouth of which he had almost closed by his vain attempts to escape, the voice of the poor fellow was recognised. With much difficulty he was extricated, and found in a state of emaciation; his body cold as ice and his thirst inextinguishable, and he scarcely able to move. They gave him at intervals small portions of bread soaked in milk and water. Two days afterwards he was able to follow his master a short distance.

This occurrence is mentioned by M. Pinguin as a proof that neither hunger nor thirst could produce rabies. Messrs. Majendie and F. Cousins have carried their observations to the extent of forty days—a disgraceful period.*

MANAGEMENT OF THE PACK.

Sixty-five couples of hounds in full work will consume the carcasses of three horses in one week, or five in a fortnight. The annual consumption of meal will be somewhat more than two tons per month.

In feeding, the light eaters should be let in first, and a little extra flesh distributed on the surface of the food, in order to coax those that are most shy. Some hounds cannot be kept to their work unless fed two or three times a-day; while others must not be allowed more than six or seven laps, or they would get too much.

In summer an extra cow or two will be of advantage in the dairy; for the milk, after it has been skimmed, may be used instead of flesh. There must always be a little flesh in hand for the sick, for bitches with their whelps, and for the entry

* *Traité de la Folie des Animaux*, tom. ii. 39.

of young hounds.* About Christmas is the time to arrange the breeding establishment. The number of puppies produced is usually from five to eight or nine; but, in one strange case, eighteen of them made their appearance. The constitution and other appearances in the dam, will decide the number to be preserved. When the whelps are sufficiently grown to run about, they should be placed in a warm situation, with plenty of fresh grass, and a sufficient quantity of clean, but not too stimulating, food. They should then be marked according to their respective letters, that they may be always recognised. When the time comes, the ears of the dog should be rounded; the size of the ear and of the head guiding the rounding-iron.

This being passed, the master of the pack takes care that his treatment shall be joyous and playful; encouragement is always with him the word. The dog should be taught the nature of the fault before he is corrected: no animal is more grateful for kindness than a hound; the peculiarities of his temper will soon be learned, and when he begins to love his master, he will mind, from his natural and acquired affection, a word or a frown from him more than the blows of all the whips that were ever put into the hands of the keepers.

The distemper having passed, and the young hounds being in good health, they should be walked out every day, and taught to follow the horse, with a keeper who is selected as a kind and quiet person, and will bear their occasionally entangling themselves in their couples. They are then taken to the public roads, and there exercised, and checked from riot, but with as little severity as possible; a frequent and free use of the whip never being allowed. No animals take their character from their master so much as the hounds do from theirs. If he is wild, or noisy, or nervous, so will his hounds be; if he is steady and quick, the pack will be the same. The whip should never be applied but for some immediate and decided fault. A rate given at an improper time does more harm than good: it disgusts the honest hound, it shies and prevents from hunting the timid one, and it is treated with contempt by those of another character who may at some future time deserve it. It formerly was the custom, and still is too much so, when a hound *has hung on a hare*, to catch him when he comes up, and flog him. The consequence of this is, that he takes good care the next time he indulges in a fault not to come out of cover at all.

We will conclude this part of our subject by a short account of the splendid kennel at Goodwood, for which we are indebted to Lord W. Lennox, with the kind permission of the Duke of Richmond. It is described as one of the most complete estab-

lishments of the kind in England. The original establishment of this building, although a little faulty, possesses considerable interest from its errors being corrected by the third Duke of Richmond, a man who is acknowledged to have been one of the most popular public characters of the day, and who in more private life extended his patronage to all that was truly honourable. It was to the Duke's support of native talent that we may trace the origin of the present Royal Academy. In 1758, the Duke of Richmond displayed, at his residence in Whitehall, a large collection of original plaster casts, taken from the finest statues and busts of the ancient sculptors. Every artist was freely admitted to this exhibition; and, for the further encouragement of talent, he bestowed two medals annually on such as had exhibited the best models.

We have thus digressed in order to give a slight sketch of the nobleman by whom this kennel was built, and we do not think that we can do better than lay before our readers the original account of it. Early in life the Duke built what was not then common, a tennis-court, and what was more uncommon, a dog-kennel, which cost him above £6000. The Duke was his own architect, assisted by, and under the guidance of, Mr. Wyatt; he dug his own flints, burnt his own lime, and conducted the wood-work in his own shops. The result of his labours was the noble building of which a plan is here given.

The dog-kennel is a grand object when viewed from Goodwood. The front is handsome, the ground well raised about it, and the general effect good; the open court in the centre adds materially to the noble appearance of the building.

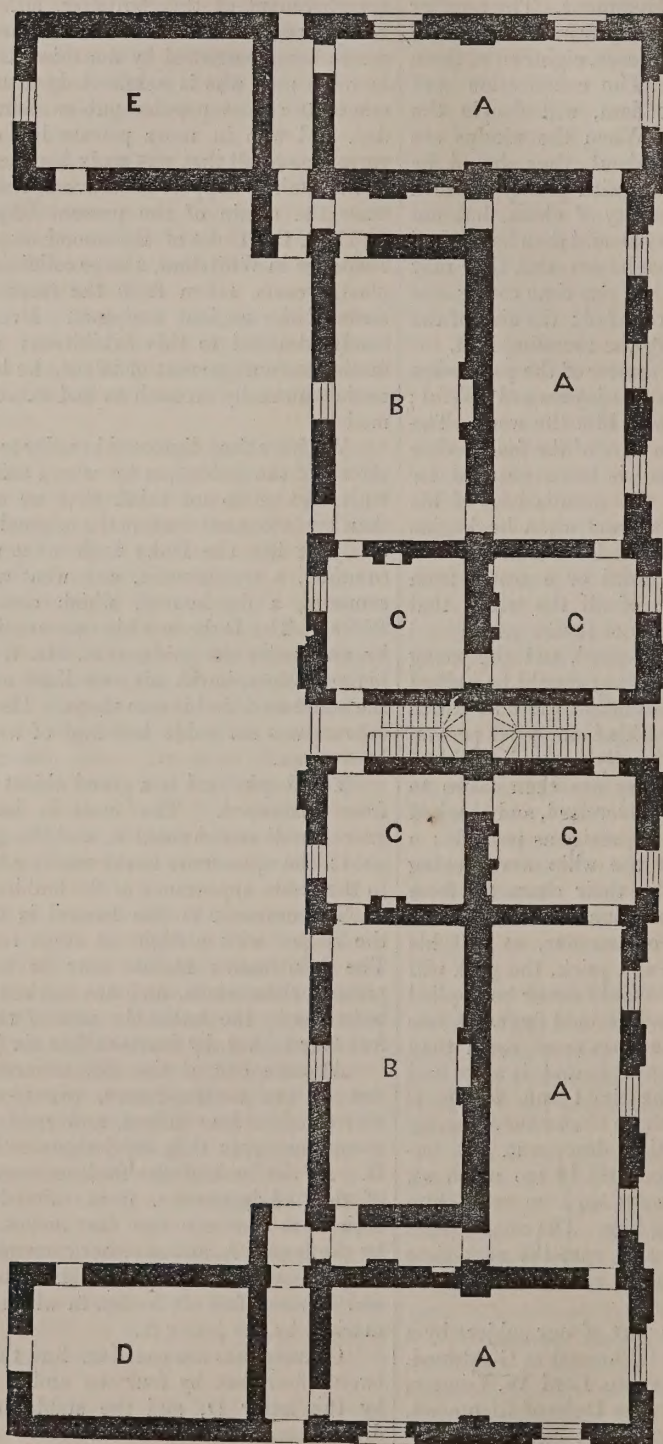
The entrance to the kennel is delineated in the centre with a flight of steps leading above. The huntsman's rooms, four in number, first present themselves, and are marked in the plan before us by the letter C; each of them is fifteen feet four inches, by fourteen feet six inches.

At each end of the side towards the court is one of the feeding-rooms, twenty-nine feet by fourteen feet four inches, and nobly constructed rooms they are; they are designated by the letters B. At the back of the feeding-rooms are one set of the lodging-rooms, from thirty-five feet six inches, to fourteen feet four inches, and marked by the letters A, and at either extremity is another lodging-room, thirty-two feet six inches in length, and fourteen feet six inches in width; this is also marked by the letter A.

Coming into the court we find the store-room, twenty-four feet by fourteen and a half, marked by the letter D, and the stable, of the same dimensions, by the letter E.

At the top of the buildings are openings for the admission of cold air, and stoves to warm the

* Mr. D. Radcliffe.



THE KENNEL AT GOODWOOD.

air when too cold. There are plentiful supplies of water from tanks holding 10,000 gallons; so that there is no inconvenience from the smell, and the whole can at any time be drained, and not be rendered altogether useless.

Round the whole building is a pavement five feet wide; airy yards, and places for breeding, &c., making part of each wing. For the huntsman and whipper-in there are sleeping-rooms, and a neat parlour or kitchen.

Soon after the kennel was erected it would contain two packs of hounds.

THE STAG-HOUND.

The largest of the English hounds that has been lately used, is devoted, as his name implies, to the chase of the deer. He is taller than the fox-hound, and with far more delicate scent, but he is not so speedy. He answers better than any other to the description given of the old English hound, so much valued when the country, less enclosed, and the forests, numerous and extensive, were the harbours of the wild deer. The deer hound and the harrier were for many centuries the only hunting dogs. The fox-hound has been much more recently bred.

The most tyrannic and cruel laws were enforced for the preservation of this species of game, and the life of the deer, except when sacrificed in the chase, and by those who were privileged to join in it, was guarded with even more strictness than the life of the human being. When, however, the country became more generally cultivated, and the stag was confined to enclosed parks, and was seldom sought in his lair, but brought into the field, and turned out before the dogs, so much interest was taken from the affair, that this species of hunting grew out of fashion, and was confined to the neighbourhood of the scattered forests that remained, and enjoyed only by royalty and a few noblemen, of whose establishment a kennel of deer-hounds had, from time immemorial, formed a part.

Since the death of George III., who was much attached to this sport, stag-hunting has rapidly declined, and the principal pleasure seems now to consist in the concourse of people brought together to an appointed place and hour, to witness the turning out of the deer. There is still maintained a royal establishment for the continuance of this noble sport; but, unless better supported than it has of late years been, it will gradually decline.

The stag-hounds are now a part of the regular Crown establishment. The royal kennel is situated upon Ascot Heath, about six miles from Windsor. At the distance of a mile from the kennel is Swinley Lodge, the official residence of the Master of the Stag-hounds.

The stag-hound is a beautiful animal. He is

distinguished from the fox-hound by the apparent broadness and shortness of his head, his longer cheek, his straighter hock, his wider thigh and deeper chest, and better feathered and more beautifully arched tail. His appearance indicates strength and stoutness, in which indeed he is unequalled, and he has sufficient speed to render it difficult for the best horses long to keep pace with him; while, as is necessary, when the distance between the footmarks of the deer is considered, his scent is most exquisite. He is far seldomer at fault than any other hound except the blood-hound, and rarely fails of running down his game.

Of the stoutness of this dog the following anecdotes will be a sufficient illustration. A deer, in the spring of 1822, was turned out before the Earl of Derby's hounds at Hayes Common. The chase was continued nearly four hours without a check, when, being almost run down, the animal took refuge in some outhouses near Speldhurst, in Kent, more than forty miles across the country, and having actually run more than fifty miles. Nearly twenty horses died in the field, or in consequence of the severity of the chase.

A stag was turned out at Wingfield Park, in Northumberland. The whole pack, with the exception of two hounds, was, after a long run, thrown out. The stag returned to his accustomed haunt, and, as his last effort, leaped the wall of the park, and lay down and died. One of the hounds, unable to clear the wall, fell and expired, and the other was found dead at a little distance. They had run about forty miles.

When the stag first hears the cry of the hounds, he runs with the swiftness of the wind, and continues to run as long as any sound of his pursuers can be distinguished. That having ceased, he pauses and looks carefully around him; but before he can determine what course to pursue the cry of the pack again forces itself upon his attention. Once more he darts away, and after a while again pauses. His strength perhaps begins to fail, and he has recourse to stratagem in order to escape. He practises the doubling and the crossing of the fox or the hare. This being useless, he attempts to escape by plunging into some lake or river that happens to lie in his way, and when, at last, every attempt to escape proves abortive, he boldly faces his pursuers, and attacks the first dog or man who approaches him.*

* The late Lord Orford reduced four stags to so perfect a degree of submission, that, in his short excursions, he used to drive them in a phaeton made for the purpose. He was one day exercising his singular and beautiful steeds in the neighbourhood of Newmarket, when their ears were saluted with the unwelcome cry of a pack of hounds, which, crossing the road in their rear, had caught the scent, and, leaving their original object of pursuit, were now in rapid chase of the frightened stags. In vain his grooms exerted themselves to the utmost; the terrified animals bounded away with the swiftness of lightning, and entered Newmarket at full speed.



THE SOUTHERN HOUND.

There used to be in the south of Devon a pack or cry of the genuine old English or southern hounds. There is some reason to believe that this was the original stock of the island, or of this part of the island, and that this hound was used by the ancient Britons in the chase of the larger kinds of game with which the country formerly abounded. Its distinguishing characters are its size and general heavy appearance; its great length of body, deep chest, and ears remarkably large and pendulous. The tones of its voice were peculiarly deep. It answered the description of Shakspeare—

"So flewed, so sanded; and their heads are hung
With ears that sweep away the morning dew;
Crook-knee'd, and dew-lapp'd, like Thessalian bulls;
Slow in pursuit, but match'd in mouth like bells,
Each under each."

It was the slowness of the breed which occasioned its disuse. Several of them, however, remained not long ago at a village called Aveton Gifford, in Devonshire, in the neighbourhood of

which some of the most opulent of the farmers used to keep two or three dogs each. When fox-hunting had assumed somewhat of its modern form, the chase was followed by a slow heavy hound, whose excellent olfactory organs enabled him to carry on the scent a considerable time after the fox-hound passed, and also over grassy fallows, and hard roads, and other places, where the modern high-bred fox-hound would not be able to recognise it. Hence the chase continued for double the duration which it does at present, and hence may be seen the reason why the old English hunter, so celebrated in former days and so great a favourite among sportsmen of the old school, was enabled to perform those feats which were exultingly bruited in his praise. The fact is, that the hounds and the horse were well matched. If the latter possessed not the speed of the Meltonian hunter, the hounds were equally slow and stanch.

THE BLOOD-HOUND.

This dog does not materially differ in appearance from the old deer-hound of a larger size, trained to hunt the human being instead of the quadruped. If once put on the tract of a supposed robber, he would unerringly follow him to his retreat, although at the distance of many a mile.

They made immediately for the Ram Inn, to which his lordship was in the habit of driving, and, having fortunately entered the yard without any accident, the stable-keepers huddled his lordship, the phaeton, and the deer into a large barn, just in time to save them from the hounds, who came into the yard in full cry a few seconds afterwards.—Annals of Sporting, vol. iii., 1823.

Such a breed was necessary when neither the private individual nor the government had other means to detect the offender. Generally speaking, however, the blood-hound of former days would not injure the culprit that did not attempt to escape, but would lie down quietly and give notice by a loud and peculiar howl what kind of prey he had found. Some, however, of a savage disposition, or trained to unnatural ferocity, would tear to pieces the hunted wretch, if timely rescue did not arrive.

Hounds of every kind, both great and small, may be broken in to follow any particular scent, and especially when they are feelingly convinced that they are not to hunt any other. This is the case with the blood-hound. He is destined to one particular object of pursuit, and a total stranger with regard to every other.

In the border country between England and Scotland, and until the union of the two kingdoms, these dogs were absolutely necessary for the preservation of property, and the detection of robbery and murder. A tax was levied on the inhabitants for the maintenance of a certain number of blood-hounds. When, however, the civic government had sufficient power to detect and punish crime, this dangerous breed of hounds fell into disuse and was systematically discouraged. It, nevertheless, at the present day, is often bred by the rangers in large forests or parks to track the deer-stealer, but oftener to find the wounded deer.

The blood-hound is taller and better formed than the deer-hound. It has large and deep ears, the forehead broad and the muzzle narrow. The expression of the countenance is mild and pleasing, when the dog is not excited; but, when he is following the robber, his ferocity becomes truly alarming.

The Thrapstone Association lately trained a blood-hound for the detection of sheep-stealers. In order to prove the utility of this dog, a person whom he had not seen was ordered to run as far and as fast as his strength would permit. An hour afterwards the hound was brought out. He was placed on the spot whence the man had started. He almost immediately detected the scent and broke away, and, after a chase of an hour and a half, found him concealed in a tree, fifteen miles distant.

Mr. John Lawrence says, that a servant, discharged by a sporting country gentleman, broke into his stables by night, and cut off the ears and tail of a favourite hunter. As soon as it was discovered, a blood-hound was brought into the stable, who at once detected the scent of the miscreant, and traced it more than twenty miles. He then stopped at a door, whence no power could move him. Being at length admitted, he ran to the top of the house, and bursting open the door of

a garret, found the object that he sought in bed, and would have torn him to pieces, had not the huntsman, who had followed him on a fleet horse, rushed up after him.

Somerville thus describes the use to which he was generally put, in pursuit of the robber:—

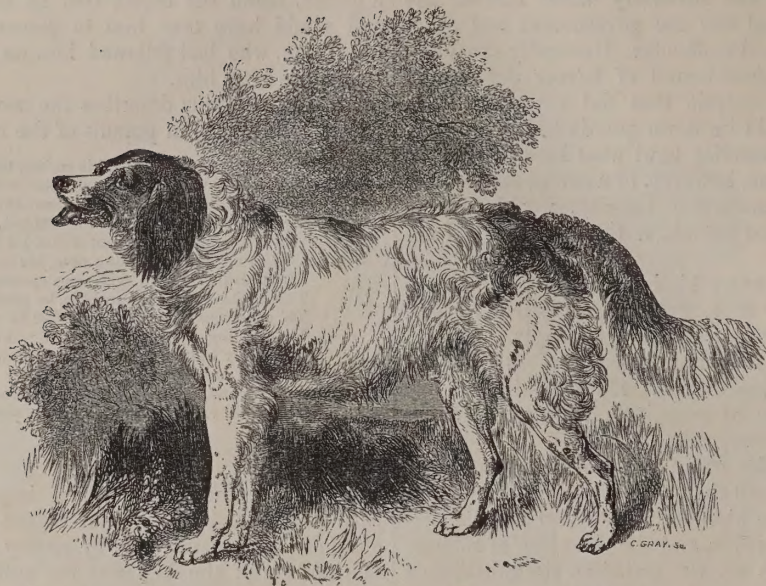
"Soon the sagacious brute, his curling tail
Flourished in air, low bending, plies around
His busy nose, the steaming vapour snuffs
Inquisitive, nor leaves one turf untried,
Till, conscious of the recent stains, his heart
Beats quick. His snuffing nose, his active tail,
Attest his joy. Then, with deep opening mouth,
That makes the welkin tremble, he proclaims
Th' audacious felon. Foot by foot he marks
His winding way. Over the watery ford,
Dry sandy heaths, and stony barren hills,
Unerring he pursues, till at the cot
Arrived, and, seizing by his guilty throat
The caitiff vile, redeems the captive prey."

THE SETTER

is evidently the large spaniel improved to his peculiar size and beauty, and taught another way of marking his game, viz., by *setting* or crouching. If the form of the dog were not sufficiently satisfactory on this point, we might have recourse to history for information on it. Mr. Daniel, in his *Rural Sports*, has preserved a document, dated in the year 1685, in which a yeoman binds himself, for the sum of ten shillings, fully and effectually to teach a spaniel to *sit* partridges and pheasants. The first person, however, who systematically broke-in setting dogs, is supposed to have been Dudley Duke of Northumberland, in 1335.

A singular dog-cause was tried in Westminster, in July, 1822. At a previous trial it was determined that the mere possession of a dog, generally used for destroying game, was sufficient proof of its being actually so used. Mr. Justice Best, however, determined that a man might be a breeder of such dogs without using them as game-dogs: and Mr. Justice Bailey thought that if a game-dog was kept in a yard, chained up by day, and let loose at night, and, being so trained as to guard the premises, he was to be considered as a yard-dog, and not as a game-dog.

The setter is used for the same purpose as the pointer, and there is great difference of opinion with regard to their relative value as sporting-dogs. Setters are not so numerous; and they are dearer, and with great difficulty obtained pure. It was long the fashion to cross and mix them with the pointer, by which no benefit was obtained, but the beauty of the dog materially impaired; many Irish sportsmen, however, were exceedingly careful to preserve the breed pure. Nothing of the pointer can be traced in them, and they are useful and beautiful dogs, altogether different in appearance from either the English or Scotch setter. The Irish sportsmen are, perhaps, a little too much prejudiced with regard to particular colours. Their



THE SETTER.

dogs are either very red, or red and white, or lemon-coloured, or white, patched with deep chestnut; and it was necessary for them to have a black nose, and a black roof to the mouth. This peculiar dye is supposed to be as necessary to a good and genuine Irish setter as is the palate of a Blenheim spaniel to the purity of his breed. A true Irish setter will obtain a higher price than either an English or Scotch one. Fifty guineas constituted no unusual price for a brace of them, and even two hundred guineas have been given. It is, nevertheless, doubtful whether they do in reality so much exceed the other breeds, and whether, although stout and hard-working dogs, and with excellent scent, they are not somewhat too headstrong and unruly.

The setter is more active than the pointer. He has greater spirit and strength. He will better stand continued hard work. He will generally take the water when necessary, and, retaining the character of the breed, is more companionable and attached. He loves his master for himself, and not, like the pointer, merely for the pleasure he shares with him. His somewhat inferior scent, however, makes him a little too apt to run into his game, and he occasionally has a will of his own. He requires good breaking, and plenty of work; but that breaking must be of a peculiar character: it must not partake of the severity which too often accompanies, and unnecessarily so, the tuition of the pointer. He has more animal spirit than the pointer, but he has not so much patient courage; and the chastisement, sometimes unnecessary and

cruel, but leaving the pointer perfect in his work, and eager for it too, would make the setter disgusted with it, and leave him a mere *blinker*. It is difficult, however, always to decide the claim of superiority between these dogs. He that has a good one of either breed may be content, but the lineage of that dog must be pure. The setter, with much of the pointer in him, loses something in activity and endurance; and the pointer, crossed with the setter, may have a degree of wildness and obstinacy, not a little annoying to his owner. The setter may be preferable when the ground is hard and rough; for he does not soon become foot-sore. He may even answer the purpose of a springer for pheasants and woodcocks, and may be valuable in recovering a wounded bird. His scent may frequently be superior to that of the pointer, and sufficiently accurate to distinguish, better than the pointer, when the game is sprung; but the steadiness and obedience of the pointer will generally give him the preference, especially in a fair and tolerably smooth country. At the beginning of a season, and when the weather is hot, the pointer will have a decided advantage.

Of the difference between the old English setter and the setters of the present day, we confess that we are ignorant, except that the first was the pure spaniel improved, and the latter the spaniel crossed too frequently with the pointer.

It must be acknowledged, that of companionableness, and disinterested attachment and gratitude, the pointer knows comparatively little. If he is a docile and obedient servant in the field, it

is all we want. The setter is unquestionably his superior in every amiable quality. Mr. Blaine says, that a large setter ill with the distemper, had been nursed by a lady more than three weeks. At length he became so ill as to be placed in a bed, where he remained a couple of days in a

dying state. After a short absence, the lady, re-entering the room, observed him to fix his eyes attentively on her, and make an effort to crawl across the bed towards her. This he accomplished, evidently for the sole purpose of licking her hand, after which he immediately expired.



THE POINTER.

The pointer is evidently descended from the hound. It is the fox-hound searching for game by the scent, but more perfectly under the control of the sportsman, repressing his cry of joy when he finds his game, and his momentary pause, and gathering himself up in order to spring upon it, artificially converted into a steady and deliberate point. There still remains a strong resemblance in countenance and in form between the pointer and the fox-hound, except that the muzzle is shorter, and the ears smaller, and partly pendulous.

Seventy or eighty years ago the breed of pointers was nearly white, or varied with liver-coloured spots; some, however, belonging to the Duke of Kingston, were perfectly black. This peculiarity of colour was supposed to be connected with exquisite perfection of scent. That is not the case with the present black pointers, who are not superior to any others.

Mr. Daniel relates an anecdote of one of his pointers. He had a dog that would always go round close to the hedges of a field before he would quarter his ground. He seemed to have

observed that he most frequently found his game in the course of this circuit.*

Mr. Johnson gives the following characteristic sketches of the different breeds of pointer:—

THE SPANISH POINTER,

originally a native of Spain, was once considered to be a valuable dog. He stood higher on his legs, but was too large and heavy in his limbs, and had widely spread, ugly feet, exposing him to frequent

* The Author of The Field Book says that he saw an extremely small pointer, whose length, from the tip of the nose to the point of the tail, was only two feet and half an inch, the length of the head being six inches, and round the chest one foot and three inches. He was an exquisite miniature of the English pointer, being in all respects similar to him, except in his size. His colour was white, with dark liver-coloured patches on each side of the head, extending half down the neck. The ears, with some patches on the back, were also of the same colour, and numerous small dark brown spots appeared over his whole body and legs.

This beautiful little animal had an exquisite sense of smell. Some of the same breed, and being the property of the Earl of Lauderdale, were broken-in and made excellent pointers, although, from their minute size, it could not be expected that they would be able to do much work. When intent upon any object, the dog assumed the same attitude as other pointers, holding up one of his feet.—The Field Book, p. 399.

lameness. His muzzle and head were large, corresponding with the acuteness of his smell. His ears were large and pendent, and his body ill-formed. He was naturally an ill-tempered dog, growling at the hand that would caress him, even although it were his master's. He stood steadily to his birds; but it was difficult to break him of chasing the hare. He was deficient in speed. His redeeming quality was his excellent scent, unequalled in any other kind of dog.

THE PORTUGUESE POINTER,

although with a slighter form than the Spanish one, is defective in the feet, often crooked in the legs, and of a quarrelsome disposition. He soon tires, and is much inclined to chase the hare. The tail is larger than that of the spaniel, and fully fringed.

THE FRENCH POINTER

is distinguished by a furrow between his nostrils, which materially interferes with the acuteness of smell. He is better formed and more active than either the Spanish or Portuguese dog, and capable of longer continued exertion; but he is apt to be quarrelsome, and is too fond of chasing the hare.

THE RUSSIAN POINTER

is a rough, ill-tempered animal, with too much tendency to stupidity, and often annoyed by vermin. He runs awkwardly with his nose near the ground, and frequently springs his game. He also has the cloven or divided nose.

THE EARLY TRAINING OF THE DOG.

The education of these dogs should commence at an early period, whether conducted by the breeder or the sportsman; and the first lesson—that on which the value of the animal, and the pleasure of its owner, will much depend—is a habit of subjection on the part of the dog, and kindness on the part of the master. This is a *sine quâ non*. The dog must recognise in his owner a friend and a benefactor. This will soon establish in the mind of the quadruped a feeling of gratitude, and a desire to please. All this is natural to the dog, if he is encouraged by the master, and then the process of breaking-in may commence in good earnest.

No long time probably passes ere the dog commits some little fault. He is careless, or obstinate, or cross. The owner puts on a serious countenance, he holds up his finger, or shakes his head, or produces the whip, and threatens to use it. Perhaps the infliction of a blow that breaks no bones occasionally follows. In the majority of cases nothing more is required. The dog succumbs; he asks to be forgiven; or, if he has been

self-willed, he may be speedily corrected without any serious punishment.

A writer under the signature of "Soho," in *The New Sporting Magazine* for 1833, gives an interesting account of the schooling of the pointer or setter, thus commenced. A short abstract from it may not be unacceptable:—

"The first lesson inculcated is that of passive obedience, and this enforced by the infliction of severity as little as the case will admit. We will suppose the dog to be a setter. He is taken into the garden or into a field, and a strong cord about eighteen or twenty yards long is tied to his collar. The sportsman calls the dog to him, looks earnestly at him, gently presses him to the ground, and several times, with a loud but not an angry voice, says, 'Down!' or 'Down charge!' The dog knows not the meaning of this, and struggles to get up; but as often as he struggles, the cry of 'Down charge!' is repeated, and the pressure is continued or increased.

"This is repeated a longer or shorter time, until the dog, finding that no harm is meant, quietly submits. He is then permitted to rise, he is patted and caressed, and some food is given to him. The command to rise is also introduced by the terms 'Hie up!' A little afterwards the same process is repeated, and he struggles less, or perhaps ceases altogether to struggle.

"The person whose circumstances permit him occasionally to shoot over his little demesne, may very readily educate his dog, without having recourse to keepers or professional breakers, among whom he would often be subject to imposition. Generally speaking, no dog is half so well broken as the one whose owner has taken the trouble of training him. The first and grand thing is to obtain the attachment of the dog, by frequently feeding and caressing him, and giving him little hours of liberty under his own inspection; but, every now and then, inculcating a lesson of obedience, teaching him that every gambol must be under the control of his master; frequently checking him in the midst of his riot with the order of 'Down charge!' patting him when he is instantly obedient; and rating or castigating him, but not too severely, when there is any reluctance to obey. *Passive obedience is the first principle, and from which no deviation should be allowed.**

"Much kindness and gentleness are certainly requisite when breaking-in the puppy, whether it be a pointer or a setter. There is heedlessness in the young dog which is not readily got rid of until age has given him experience. He must not, however, be too severely corrected, or he may be spoiled for life. If considerable correction is sometimes necessary, it should be followed, at a little

* Another writer in the same volume gives also an interesting account of the management of the setter.

distance of time, by some kind usage. The memory of the suffering will remain; but the feeling of attachment to the master will also remain, or rather be increased. The temper of a young dog must be almost as carefully studied as that of a human being. Timidity may be encouraged, and eagerness may be restrained, but affection must be the tie that binds him to his master, and renders him subservient to his will.

"The next portion of the lesson is more difficult to learn. He is no longer held by his master, but suffered to run over the field, seemingly at his pleasure, when, suddenly, comes the warning 'Down!' He perhaps pays no attention to it, but gambols along until seized by his master, forced on the ground, and the order of 'Down!' somewhat sternly uttered.

"After a while he is suffered again to get up. He soon forgets what has occurred, and gallops away with as much glee as ever. Again the 'Down!' is heard, and again little or no attention is paid to it. His master once more lays hold of him and forces him on the ground, and perhaps inflicts a slight blow or two, and this process continues until the dog finds that he must obey the command of 'Down charge!'

"The owner will now probably walk from him a little way backward with his hand lifted up. If the dog makes the slightest motion, he must be sharply spoken to, and the order peremptorily enforced.

"He must then be taught to 'back,' that is, to come behind his master when called. When he seems to understand all this, he is called by his master in a kindly tone, and patted and caressed. It is almost incredible how soon he will afterwards understand what he is ordered to do, and perform it.

"It will be seen by this that no one should attempt to break-in a dog who is not possessed of patience and perseverance. The sportsman must not expect to see a great deal of improvement from the early lessons. The dog will often forget that which was inculcated upon him a few hours before; but perseverance and kindness will effect much: the first lessons over, the dog, beginning to perceive a little what is meant, will cheerfully and joyfully do his duty.

"When there is much difficulty in teaching the dog his lesson, the fault lies as often with the master as with him; or they are, generally speaking, both in fault. Some dogs cannot be mastered but by means of frequent correction. The less the sportsman has to do with them the better. Others will not endure the least correction, but become either ferocious or sulky. They should be disposed of as soon as possible. The majority of dogs are exceedingly sagacious. They possess strong reasoning powers; they understand, by intuition,

almost every want and wish of their master, and they deserve the kindest and best usage.

"The scholar being thus prepared, should be taken into the field, either alone, or, what is considerably better, with a well-trained, steady dog. When the old dog makes a point, the master calls out, 'Down!' or 'Soho!' and holds up his hand, and approaches steadily to the birds; and, if the young one runs in, or prepares to do so, as probably he will at first, he again raises his hand and calls out 'Soho!' If the youngster pays no attention to this, the whip must be used, and in a short time he will be steady enough at the first intimation of game.

"If he springs any birds without taking notice of them, he should be dragged to the spot from which they rose, and 'Soho!' being cried, one or two sharp strokes with the whip should be inflicted. If he is too eager, he should be warned to 'take heed.' If he *rakes* or runs with his nose near the ground, he should be admonished to *hold up*, and, if he still persists, the *muzzle-peg* may be resorted to. Some persons fire over the dog for running at hares: but this is wrong; for, beside the danger of wounding or even killing the animal, he will for some time afterwards be frightened at the sound, or even at the very sight of a gun. The best plan to accustom dogs to the gun, is occasionally to fire one off when they are being fed.

"Some persons let their dog fetch the dead birds. This is very wrong. Except the sportsman has a double-barrelled gun, the dog should not be suffered to move until the piece is again charged. The young one, until he is thoroughly broken of it, is too apt to run-in, whether the bird is killed or not, and which may create much mischief by disturbing the game.

"Although excessive punishment should not be administered, yet no fault, however small, should pass without reproof; on the other hand, he should be rewarded, but not too lavishly, for every instance of good conduct.

"When the dog is grown tolerably steady, and taught to come at the call, he should also learn to range and quarter his ground. Let some clear morning, and some place where the sportsman is likely to meet with game, be selected. Station him where the wind will blow in his face; wave your hand and cry, 'Heigh on, good dog!' Then let him go off to the right about seventy or eighty yards. After this call him in by another wave of the hand, and let him go the same distance to the left. Walk straight forward, with your eye always upon him; then let him continue to cross from right to left, calling him in at the limit of each range.

"This is at first a somewhat difficult lesson, and requires careful teaching. The same ground is never to be twice passed over. The sportsman watches every motion, and the dog is never trusted

out of sight, or allowed to break fence. When this lesson is tolerably learned, and on some good scenting morning early in the season he may take the field, and perhaps find. Probably, he will be too eager, and spring his game. Make him *down* immediately, and take him to the place where the birds rose. Chide him with 'Steady!' 'How dare you!' Use no whip; but scold him well, and be assured that he will be more cautious. If possible, kill on the next chance. The moment the bird is down, he will probably rush in and seize it. He must be met with the same rebuff, 'Down charge!' If he does not obey, he deserves to have, and will have, a stroke with the whip. The gun being again charged, the bird is sought for, and the dog suffered to see it and play with it for a minute before it is put into the bag.

"He will now become thoroughly fond of the sport, and his fondness will increase with each bird that is killed. At every time, however, whether he kills or misses, the sportsman should make the dog 'Down charge,' and never allow him to rise until he has loaded.

"If a hare should be wounded there will, occasionally, be considerable difficulty in preventing him from chasing her. The best broken and steadiest dog cannot always be restrained from running hares. He must be checked with '*Ware chase*,' and, if he does not attend, the sportsman must wait patiently. He will, by-and-by, come slinking along with his tail between his legs, conscious of his fault. It is one, however, that admits of no pardon. He must be secured, and, while the field echoes with the cry of '*Ware chase*,' he must be punished to a certain but not too great extent. The castigation must be repeated as often as he offends; or, if there is much difficulty in breaking him of the habit, he must be got rid of."

The breaking-in or subjugation of pointers and

setters is a very important, and occasionally a difficult affair; the pleasure of the sportsman, however, depends upon it. The owner of any considerable property will naturally look to his keeper to furnish him with dogs on which he may depend, and he ought not to be disappointed; for those which belong to other persons, or are brought at the beginning of the season, whatever account the breaker or the keeper of them may give, will too often be found deficient.

THE OTTER HOUND

used to be of a mingled breed, between the southern hound and the rough terrier, and in size between the harrier and the fox-hound. The head should be large and broad, the shoulders and quarters thick, and the hair strong, wiry, and rough. They used to be kept in small packs, for the express purpose of hunting the otter.

Two hundred and fifty years ago otter-hunting was a favourite amusement in several parts of Great Britain. Many of our streams then abounded with this destructive animal; but, since the population of our country has become more dense, and game-keepers are more numerous, and many contrivances are adopted to ensnare and destroy otters, few are now to be found.

THE TURNSPIT.

This dog was, once a valuable auxiliary in the kitchen, by turning the spit before jacks were invented. It had a peculiar length of body, with short crooked legs, the tail curled, its ears long and pendent, and the head large in proportion to the body. It is still used in the kitchen on various parts of the Continent. There are some curious stories of the artfulness with which he often attempted to avoid the task imposed upon him.

There is a variety of this dog; the crooked-legged turnspit.

CHAPTER IV.

THE VARIETIES OF THE DOG.—THIRD DIVISION.

The muzzle more or less shortened, the frontal sinus enlarged, and the cranium elevated and diminished in capacity.

At the head of this inferior or brutal division of dog stands

THE BULLDOG.

The round, thick head, turned-up nose, and thick and pendulous lips of this dog are familiar to all, while his ferocity makes him in the highest degree dangerous. In general he makes a silent

although a ferocious attack, and the persisting powers of his teeth and jaws enable him to keep his hold against any but the greatest efforts, so that the utmost mischief is likely to ensue as well to the innocent visitor of his domicile as the ferocious intruder. The bulldog is scarcely capable of any education, and is fitted for nothing but ferocity and combat.

The name of this dog is derived from his being too often employed, until a few years ago, in baiting the bull. It was practised by the low and disso-



THE BULLDOG.

lute in many parts of the country. Dogs were bred and trained for the purpose; and, while many of them were injured or destroyed, the head of the bull was lacerated in the most barbarous manner. Nothing can exceed the fury with which the bull-dog rushed on his foe, and the obstinacy with which he maintained his hold. He fastened upon the lip, the muzzle, or the eye, and there he hung, in spite of every effort of the bull to free himself from his antagonist.

Bull-dogs are not so numerous as they were a few years ago; and every kind-hearted person will rejoice to hear that bull-baiting is now put down by legal authority in every part of the kingdom.

THE BULL-TERRIER.

This dog is a cross between the bull-dog and the terrier, and is generally superior, both in appearance and value, to either of its progenitors. A second cross considerably lessens the underhanging of the lower jaw, and a third entirely removes it, retaining the spirit and determination of the animal. It forms a steadier friendship than either of them, and the principal objection to it is its love of wanton mischief, and the dangerous irascibility which it occasionally exhibits.

Sir Walter Scott, a warm friend of dogs, and whose veracity cannot be impeached, gives an

interesting account of a favourite one belonging to him. "The cleverest dog I ever had was what is called a bull-dog terrier. I taught him to understand a great many words, insomuch that I am positive the communication between the canine species and ourselves might be greatly enlarged. Camp, the name of my dog, once bit the baker when bringing bread to the family. I beat him, and explained the enormity of the offence; after which, to the last moment of his life, he never heard the least allusion to the story without creeping into the darkest corner of the room. Towards the end of his life, when he was unable to attend me while I was on horseback, he generally watched for my return, and, when the servant used to tell him his master was coming down the hill, or through the moor, although he did not use any gesture to explain his meaning, Camp was never known to mistake him, but either went out at the front to go up the hill, or at the back to get down to the moor-side!"

THE MASTIFF.

The head considerably resembles that of the bull-dog, but with the ears dependent. The upper lip falls over the lower jaw. The end of the tail is turned up, and frequently the fifth toe of the hind feet is more or less developed. The nostrils are

separated one from another by a deep furrow. He has a grave and somewhat sullen countenance, and his deep-toned bark is often heard during the night. The mastiff is taller than the bull-dog, but not so deep in the chest, and his head is large compared with his general form.

It is probable that the mastiff is an original breed peculiar to the British islands.

He seems to be fully aware of the impression which his large size makes on every stranger; and, in the night especially, he watches the abode of his master with the completest vigilance; in fact, nothing would tempt him to betray the confidence which is reposed in him

Captain Brown states that, "notwithstanding his commanding appearance and the strictness with which he guards the property of his master, he is possessed of the greatest mildness of conduct, and is as grateful for any favours bestowed upon him as is the most diminutive of the canine tribe. There is a remarkable and peculiar warmth in his attachments. He is aware of all the duties required of him, and he punctually discharges them. In the course of the night he several times examines everything with which he is intrusted with the most scrupulous care, and, by repeated barkings, warns the household or the depredator that he is at the post of duty." *



THE MASTIFF.

The mastiff from Cuba requires some mention, and will call up some of the most painful recollections in the history of the human race. He was not a native of Cuba, but imported into the country.

The Spaniards had possessed themselves of several of the South American islands. They found them peopled with Indians, and those of a sensual, brutish, and barbarous class—continually making war with their neighbours, indulging in an irreconcilable hatred of the Spaniards, and determined to expel and destroy them. In self-defence, they were driven to some means of averting the

destruction with which they were threatened. They procured some of these mastiffs, by whose assistance they penetrated into every part of the country, and destroyed the greater portion of the former inhabitants.

Las Casas, a Catholic priest, and whose life was employed in endeavouring to mitigate the sufferings of the original inhabitants, says that "it was resolved to march against the Indians, who had fled to the mountains, and they were chased like wild beasts, with the assistance of bloodhounds, who had been trained to a thirst for

* Brown's Biographical Sketches, p. 425.

human blood, so that before I had left the island it had become almost entirely a desert."

THE ICELAND DOG.

The head is rounder than that of the northern dogs; the ears partly erect and partly pendent; and the fur soft and long, especially behind the fore-legs and on the tail. It much resembles the Turkish dog removed to a colder climate.

This dog is exceedingly useful to the Icelanders while travelling over the snowy deserts of the north. By a kind of intuition he rarely fails in choosing the shortest and the safest course. He also is more aware than his master of the approach of the snow-storms; and is a most valuable ally against the attack of the Polar bear, who, drifted on masses of ice from the neighbouring continent, often commits depredations among the cattle, and even attacks human beings. When the dog is first aware of the neighbourhood of the bear, he sets up a fearful howl, and men and dogs hasten to hunt down and destroy the depredator.

The travelling in Iceland is sometimes exceedingly dangerous at the beginning of the winter. A thin layer of snow covers and conceals some of the chasms with which that region abounds. Should the traveller fall into one of them, the dog proves a most useful animal; for he runs immediately across the snowy waste, and, by his howling, induces the traveller's friends to hasten to his rescue.

THE TERRIER.

The forehead is convex; the eye prominent; the muzzle pointed; the tail thin and arched; the fur short; the ears of moderate size, half erect, and usually of a deep-black colour, with a yellow spot over the eyes. It is an exceedingly useful animal; but not so indispensable an accompaniment to a pack of fox-hounds as it used to be accounted. Foxes are not so often unearthed as they formerly were, yet many a day's sport would be lost without the terrier. Some sportsmen used to have two terriers accompanying in the pack, one being smaller than the other. This was a very proper provision; a large terrier might be incapable of penetrating into the earth, and a small one might permit the escape of the prey. Many terriers have lost their lives by scratching up the earth behind them, and thus depriving themselves of all means of retreat.

The coat of the terrier may be either smooth or rough; the smooth-haired ones are more delicate in appearance, and are somewhat more exposed to injury or accident; but in courage, sagacity, and strength, there is very little difference if the dogs are equally well bred. The rough terrier possibly obtained his shaggy coat from the cur, and the smooth terrier may derive his from the hound.

The terrier is seldom of much service until he

is twelve months old; and then, incited by natural propensity, or the example of the older ones, or urged on by the huntsman, he begins to discharge his supposed duty.

An old terrier is brought to the mouth of the earth in which a vixen fox—a fox with her young ones—has taken up her abode, and is sent in to worry and drive her out. Some young terriers are brought to the mouth of the hover, to listen to the process that is going forward within, and to be excited to the utmost extent of which they are capable. The vixen is at length driven out, and caught at the mouth of the hole; and the young ones are suffered to rush in, and worry or destroy their first prey. They want no after-tuition to prepare them for the discharge of their duty.

This may be pardoned. It is the most ready way of training the young dog to his future business; but it is hoped that no reader of this work will be guilty of the atrocities that are often practised. An old fox, or badger, is caught, his under jaw is sawn off, and the lower teeth are forcibly extracted, or broken. A hole is then dug in the earth, or a barrel is placed large and deep enough to permit a terrier, or perhaps two of them, to enter. Into this cavity the fox or badger is thrust, and a terrier rushes after him, and drags him out again. The question to be ascertained is, how many times in a given period the dog will draw this poor tortured animal out of the barrel—an exhibition of cruelty which no one should be able to lay to the charge of any human being. It is a principle not to be departed from, that wanton and useless barbarity should never be permitted. The government, to a certain extent, has interfered, and a noble society has been established to limit, or, if possible, to prevent the infliction of useless pain.

The terrier is, however, a valuable dog, in the house and the farm. The stoat, the pole-cat, and the weazel, commit great depredations in the fields, the barn, and granary; and to a certain extent, the terrier is employed in chasing or destroying them; but it is not often that he has a fair chance to attack them. He is more frequently used in combating the rat.

The mischief effected by rats is almost incredible. It has been said that, in some cases, in the article of corn, these animals consume a quantity of food equal in value to the rent of the farm. Here the dog is usefully employed, and in his very element, especially if there is a cross of the bull-dog about him.

There are some extraordinary accounts of the dexterity, as well as courage, of the terrier in destroying rats. The feats of a dog called "Billy" will be long remembered. He was matched to destroy one hundred large rats in eight and a half minutes. The rats were brought into the ring in bags, and as soon as the number was complete, he was put over the railing. In six minutes and

thirty-five seconds they were all destroyed. In another match he destroyed the same number in six minutes and thirteen seconds. At length, when he was getting old, and had but two teeth and one eye left, a wager was laid of thirty sovereigns, by the owner of a Berkshire bitch, that she would kill fifty rats in less time than Billy. The old dog killed his fifty in five minutes and six seconds. The pit was then cleared, and the bitch let in. When she had killed thirty rats, she was completely exhausted, fell into a fit, and lay barking and yelping, utterly incapable of completing her task.

The speed of the terrier is very great. One has been known to run six miles in thirty-two minutes. He needs to be a fleet dog, if, with his comparatively little bulk, he can keep up with the foxhound.

A small breed of *wry-legged* terriers was once in repute, and, to a certain degree, is retained for the purpose of hunting rabbits. It probably originated in some rickety specimens, remarkable for the slow development of their frame, except in the head, the belly, and the joints, which enlarge at the expense of the other parts.



THE SCOTCH TERRIER.

There is reason to believe that this dog is far older than the English terrier. There are three varieties: first, the common Scotch terrier, twelve or thirteen inches high; his body muscular and compact—considerable breadth across the loins—the legs shorter and stouter than those of the English terriers. The head large in proportion to the size of the body—the muzzle small and pointed—strong marks of intelligence in the countenance—warm attachment to his master, and the evident devotion of every power to the fulfilment of his wishes. The hair is long and tough, and extending over the whole of the frame.

In colour, they are black or fawn: the white, yellow, or pied are always deficient in purity of blood.

Another species has nearly the same confor-

mation, but is covered with longer, more curly, and stouter hair: the legs being apparently, but not actually shorter. This kind of dog prevails in the greater part of the Western Islands of Scotland, and some of them, where the hair has obtained its full development, are much admired.

Her Majesty had one from Islay, a faithful and affectionate creature, yet with all the spirit and determination that belongs to his breed. The writer of this account had occasion to operate on this poor fellow, who had been bitten under somewhat suspicious circumstances. He submitted without a cry or a struggle, and seemed to be perfectly aware that we should not put him to pain without having some good purpose in view.

A third species of terrier is of a considerably

larger bulk, and three or four inches taller than either of the others. Its hair is shorter than that of the other breeds, and is hard and wiry.

THE SHOCK-DOG

is traced by Buffon, but somewhat erroneously, to a mixture of the small Danish dog and the pug. The head is round, the eyes large, but somewhat concealed by its long and curly air, the tail curved and bent forward. The muzzle resembles that of the pug. It is of a small size, and is used in this country and on the Continent as a lap-dog. It is very properly described by the author of "The Field Book" as a useless little animal, seeming to possess no other quality than that of a faithful attachment to his mistress.

THE ARTOIS DOG,

with his short, flat muzzle, is a produce of the shock-dog and the pug. He has nothing peculiar to recommend him.

THE ANDALUSIAN, OR ALICANT DOG,

has the short muzzle of the pug with the long hair of the spaniel.

THE EGYPTIAN AND BARBARY DOG,

according to Cuvier, has a very thick and round head, the ears erect at the base, large and moveable, and carried horizontally; the skin nearly naked, and black or dark-flesh colour, with large patches of brown. A sub-variety has a kind of mane behind the head, formed of long stiff hairs.

Buffon imagines that the shepherd's dog—transported to different climates, and acquiring different habits, was the ancestor of the various species with which almost every country abounds; but whence they originally came it is impossible to say. They vary in their size, their colour, their attitude, their usual exterior, and their strangely different interior construction. Transported into various climates, they are necessarily submitted to the influence of heat and cold, and of food more or less abundant, and more or less suitable to their natural organization, but the reason or the derivation of these differences of structure it is not always easy to explain.

CHAPTER V.

THE GOOD QUALITIES OF THE DOG; THE SENSE OF SMELL; INTELLIGENCE; MORAL QUALITIES; DOG-CARTS; CROPPING; TAILING; BREAKING-IN; DOG-PITS; DOG-STEALING.

In our history of the different breeds of the dog we have seen enough to induce us to admire and love him. His courage, his fidelity, and the degree in which he often devotes every power that he possesses to our service, are circumstances that we can never forget nor overlook. His very foibles occasionally attach him to us. We may select a pointer for the pureness of his blood and the perfection of his education. He transgresses in the field. We call him to us; we scold him well; perchance, we chastise him. He lies motionless and dumb at our feet. The punishment being over, he gets up, and, by some significant gesture, acknowledges his consciousness of deserving what he has suffered. The writer operated on a pointer bitch for an enlarged cancerous tumour, accompanied by much inflammation and pain in the surrounding parts. A word or two of kindness and of caution were all that were necessary, although, in order to prevent accidents, she had been bound securely. The flesh quivered as the knife pursued its course—a moan or two escaped her, but yet she did not struggle; and her first act, after all was over, was to lick the operator's hand.

From the combination of various causes, the history of no animal is more interesting than that of the dog. First, his intimate association with

man, not only as a valuable protector, but as a constant and faithful companion throughout all the vicissitudes of life. Secondly, from his natural endowments, not consisting in the exquisite delicacy of one individual sense—not merely combining memory with reflection—but possessing qualities of the mind that stagger us in the contemplation of them, and which we can alone account for in the gradation existing in that wonderful system which, by different links of one vast chain, extends from the first to the last of all things until it forms a perfect whole on the wonderful confines of the spiritual and material world.

We here quote the beautiful account of Sir Walter Scott and his dogs, as described by Henry Hallam:—

"But looking towards the grassy mound
Where calm the Douglas chieftains lie,
Who, living, quiet never found,
I straightway learnt a lesson high;
For there an old man sat serene,
And well I knew that thoughtful mien
Of him whose early lyre had thrown
O'er mouldering walls the magic of its tone.

It was a comfort, too, to see
Those dogs that from him ne'er would rove,
And always eyed him reverently,
With glances of depending love.

They know not of the eminence
Which marks him to my reasoning sense;
They know but that he is a man,
And still to them is kind, and glads them all he can.

And hence their quiet looks confiding;
Hence grateful instincts, seated deep,
By whose great bond, were ill betiding,
They'd loose their own, his life to keep.
What joy to watch in lower creature
Such dawning of a moral nature,
And how (the rule all things obey)
They look to a higher mind to be their law and stay!"

The subject of the intellectual and moral qualities of the inferior animals is one highly interesting and somewhat misunderstood—urged perhaps to a ridiculous extent by some persons, yet altogether neglected by others who have no feeling for any but themselves.

Anatomists have compared the relative bulk of the brain in different animals, and the result is not a little interesting. In man the weight of the brain amounts on the average to 1-30th part of the body. In the Newfoundland dog it does not amount to 1-60th part, or to 1-100th part in the poodle and barbet, and not to more than 1-300th part in the ferocious and stupid bull-dog.

When the brain is cut, it is found to be composed of two substances, essentially different in construction and function—the cortical and the medullary. The first is small in quantity, and principally concerned in the food and reproduction of the animal, and the cineritious in a great measure the register of the mind. Brute strength seems to be the character of the former, and superior intelligence of the latter. There is, comparing bulk with bulk, less of the medullary substance in the horse than in the ox—and in the dog than in the horse—and they are characterized as the sluggish ox, the intelligent horse, and the intellectual and companionable dog.

From the medullary substance proceed certain cords or prolongations, termed *nerves*, by which the animal is enabled to receive impressions from surrounding objects and to connect himself with them, and also to possess many pleasurable or painful sensations. One of them is spread over the membrane of the nose, and gives the sense of smell; another expands on the back of the eye, and the faculty of sight is gained; a third goes to the internal structure of the ear, and the animal is conscious of sound. Other nerves, proceeding to different parts, give the faculty of motion, while an equally important one bestows the power of feeling. One division, springing from a prolongation of the brain, and yet within the skull, wanders to different parts of the frame, for important purposes connected with respiration or breathing. The act of breathing is essential to life, and were it to cease, the animal would die.

There are other nerves—the sympathetic—so called from their union and sympathy with all the

others, and identified with life itself. They proceed from a small ganglion or enlargement in the upper part of the neck, or from a collection of minute ganglia within the abdomen. They go to the heart, and it beats; and to the stomach, and it digests. They form a net-work round each vessel, and the frame is nourished and built up. They are destitute of sensation, and they are perfectly beyond the control of the will.

We have been accustomed, and properly, to regard the nervous system, or that portion of it which is connected with animal life—that which renders us conscious of surrounding objects and susceptible of pleasure and of pain—as the source of intellectual power and moral feeling. It is so with ourselves. All our knowledge is derived from our perception of things around us. A certain impression is made on the outward fibres of a sensitive nerve. That impression, in some mysterious way, is conveyed to the brain; and there it is received—registered—stored—and compared; there its connexions are traced and its consequences appreciated; and thence a variety of interesting impressions are conveyed and due use is made of them.

THE SENSE OF SMELL.

Our subject—the intellectual and moral feelings of brutes, and the mechanism on which they depend—may be divided into two parts, the portion that receives and conveys, and that which stores up and compares and uses the impression.

The portion that receives and conveys is far more developed in the brute than in the human being. Whatever sense we take we clearly perceive the triumph of animal power.

The olfactory nerve in the horse, the dog, the ox, and the swine, is the largest of all the cerebral nerves, and has much greater comparative bulk in the quadruped than in the human being. The sense of smell bearing proportion to the nerve on which it depends, is yet more acute. In man it is connected with pleasure—in the inferior animals with life. The relative size of the nerve bears an invariable proportion to the necessity of an acute sense of smell in the various animals—large in the horse compared with the olfactory nerve in the human being—larger in the ox, who is often sent into the fields to shift for himself—larger still in the swine, whose food is buried under the soil, or deeply immersed in the filth or refuse—and still larger in the dog, the acuteness of whose scent is so connected with our pleasure.

INTELLIGENCE.

We find little mention of insanity in the domesticated animals in any of our modern authors, whether treating on agriculture, horsemanship, or

veterinary medicine, and yet there are some singular and very interesting cases of aberration of intellect. The inferior animals are, to a certain extent, endowed with the same faculties as ourselves. They are even susceptible of the same moral qualities. Hatred, love, fear, hope, joy, distress, courage, timidity, jealousy, and many varied passions influence and agitate them, as they do the human being. The dog is an illustration of this—the most susceptible to every impression—approaching the nearest to man in his instincts, and in many actions that surprise the philosopher, who justly appreciates it.

What eagerness to bite is often displayed by the dog when labouring under enteritis, and especially by him who has imbibed the poison of rabies! How singular is the less dangerous malady which induces the horse and the dog to press unconsciously forward under the influence of vertigo!—the eagerness with which, when labouring under phrenitis, he strikes at everything with his foot, or rushes upon it to seize it with his teeth! A kind of nostalgia is often recognised in that depression which nothing can dissipate, and the invincible aversion to food, by means of which many animals perish, who are prevented from returning to the place where they once lived, and the localities to which they had been accustomed.

These are circumstances proving that the dog is endowed with intelligence and with affections like ours; and, if they do not equal ours, they are of the same character.

With regard to the foundation of intellectual power, viz., attention, memory, association, and imagination, the difference between man and animals is in degree, and not in kind. Thus stands the account,—with the quadruped as well as the biped,—the impression is made on the mind; attention fixes it there; memory recurs to it; imagination combines it, rightly or erroneously, with many other impressions; judgment determines the value of it, and the conclusions that are to be drawn from it, if not with logical precision, yet with sufficient accuracy for every practical purpose.

A bitch, naturally ill-tempered, and that would not suffer a stranger to touch her, had scirrhus enlargement on one of her teats. As she lay in the lap of her mistress, an attempt was repeatedly made to examine the tumour, in spite of many desperate attempts on her part to bite. All at once, however, something seemed to strike her mind. She whined, wagged her tail, and sprung from the lap of her mistress to the ground. It was to crouch at the feet of the surgeon, and to lay herself down and expose the tumour to his inspection. She submitted to a somewhat painful examination of it, and to a far more serious operation afterwards. Some years passed away, and

whenever she saw the operator, she testified her joy and her gratitude in the most expressive and endearing manner.

A short time since, the following scene took place in a street adjoining Hanover Square. It was an exhibition of a highly interesting character, and worthy to be placed upon record. The editor of the *Lancet* having heard that a French gentleman (M. Léonard), who had for some time been engaged in instructing two dogs in various performances that required the exercise, not merely of the natural instincts of the animal and the power of imitation, but of a higher intellect, and a degree of reflection and judgment far greater than is commonly developed in the dog, was residing in London, obtained an introduction, and was obligingly favoured by M. Léonard with permission to hold a *conversazione* with his extraordinary pupils. He thus describes the interview:—

Two fine dogs, of the Spanish breed, were introduced by M. Léonard, with the customary French *politesse*, the largest by the name of M. Philax, the other as M. Brac (or spot); the former had been in training three, the latter two, years. They were in vigorous health, and, having bowed very gracefully, seated themselves on the hearth-rug side by side. M. Léonard then gave a lively description of the means he had employed to develop the cerebral system in these animals—how, from having been fond of the chace, and ambitious of possessing the best-trained dogs, he had employed the usual course of training—how the conviction had been impressed on his mind, that by gentle usage, and steady perseverance in inducing the animal to repeat again and again what was required, not only would the dog be capable of performing that specific act, but that part of the brain which was brought into activity by the mental effort would become more largely developed, and hence a permanent increase of mental power be obtained.

This reasoning is in accordance with the known laws of the physiology of the nervous system, and is fraught with the most important results. We may refer the reader interested in the subject to the masterly little work of Dr. Verity, “Changes produced in the Nervous System by Civilization.”

After this introduction, M. Léonard spoke to his dogs in French, in his usual tone, and ordered one of them to walk, the other to lie down, to run, to gallop, halt, crouch, &c., which they performed as promptly and correctly as the most docile children. Then he directed them to go through the usual exercises of the *manège*, which they performed as well as the best trained ponies at Astley's.

He next placed six cards of different colours on the floor, and, sitting with his back to the dogs, directed one to pick up the blue card, and the other the white, &c., varying his orders rapidly, and

speaking in such a manner that it was impossible the dogs could have executed his commands if they had not had a perfect knowledge of the words. For instance, M. Léonard said, "Philax, take the red card and give it to Brac; and, Brac, take the white card and give it to Philax;" the dogs instantly did this, and exchanged cards with each other. He then said, "Philax, put your card on the green, and Brac, put yours on the blue;" and this was instantly performed. Pieces of bread and meat were placed on the floor, with figured cards, and a variety of directions were given to the dogs, so as to put their intelligence and obedience to a severe test. They brought the meat, bread, or cards, as commanded, but did not attempt to eat or to touch unless ordered. Philax was then ordered to bring a piece of meat and give it to Brac, and then Brac was told to give it back to Philax, who was to return it to its place. Philax was next told he might bring a piece of bread and eat it; but, before he had time to swallow it, his master forbade him, and directed him to show that he had not disobeyed, and the dog instantly protruded the crust between his lips.

While many of these feats were being performed, M. Léonard snapped a whip violently, to prove that the animals were so completely under discipline, that they would not heed any interruption.

After many other performances, M. Léonard invited a gentleman to play a game of dominos with one of them. The younger and slighter dog then seated himself on a chair at the table, and the writer and M. Léonard seated themselves opposite. Six dominos were placed on their edges in the usual manner before the dog, and a like number before the writer. The dog having a double number, took one up in his mouth, and put it in the middle of the table; the writer placed a corresponding piece on one side; the dog immediately played another correctly, and so on until all the pieces were engaged. Other six dominos were then given to each, and the writer intentionally placed a wrong number. The dog looked surprised, stared very earnestly at the writer, growled, and finally barked angrily. Finding that no notice was taken of his remonstrances, he pushed away the wrong domino with his nose, and took up a suitable one from his own pieces, and placed it in its stead. The writer then played correctly; the dog followed, and won the game. Not the slightest intimation could have been given by M. Léonard to the dog. This mode of play must have been entirely the result of his own observation and judgment. It should be added that the performances were strictly private. The owner of the dogs was a gentleman of independent fortune, and the instruction of his dogs had been taken up merely as a curious and amusing investigation.*

* Plutarch relates that, at the theatre of Marcellus, a dog was exhibited before the emperor Vespasian, so well instructed as to

Another strange attainment of the dog is the learning to speak. The French Academicians mention one of these animals that could call in an intelligible manner for tea, coffee, chocolate, &c. The account is given by the celebrated Leibnitz, who communicated it to the Royal Academy of France. This dog was of a middling size, and was the property of a peasant in Saxony.

A little boy, a peasant's son, imagined that he perceived in the dog's voice an indistinct resemblance to certain words, and therefore took it into his head to teach him to speak. For this purpose he spared neither time nor pains with his pupil, who was about three years old when his learned education commenced, and in process of time he was able to articulate no fewer than thirty distinct words. He was, however, somewhat of a truant, and did not very willingly exert his talent, and was rather pressed than otherwise into the service of literature. It was necessary that the words should be pronounced to him each time, and then he repeated them after his preceptor. Leibnitz attests that he heard the animal talk in this way, and the French Academicians add, that unless they had received the testimony of so celebrated a person they would scarcely have dared to report the circumstance. It took place in Misnia, in Saxony.

THE MORAL QUALITIES OF THE DOG.

We pass on to another division of our subject, *the moral qualities of the dog*, strongly developed and beautifully displayed, and often putting the biped to shame.

It is truly said of the dog that he possesses

"Many a good
And useful quality, and virtue too.
Attachment never to be weaned or changed
By any change of fortune; proof alike
Against unkindness, absence, and neglect;
Fidelity, that neither bribe nor threat
Can move or warp; and gratitude, for small
And trivial favours, lasting as the life,
And glistening even in the dying eye."

It may here be noticed that, among the inferior animals with large nerves and more medullary substance, there are acuter senses; but man excelling them in the general bulk of his brain, and more particularly in the cortical portion of it, has far superior powers of mind. These are circumstances that deserve the deepest consideration. In their wild state the brutes have no concern—no idea beyond their food and their reproduction. In their domesticated state, they are doomed to be the servants of man. Their power of mind is sufficient

exercise in every kind of dance. He afterwards feigned illness in a most singular manner, so as to strike the spectators with astonishment. He first exhibited various symptoms of pain; he then fell down as if dead, and, afterwards seeming to revive, as if waking from a profound sleep, and then sported about and showed various demonstrations of joy.

to qualify them for this service; but were proportionate intellectual capacity added to this—were they made conscious of their strength, and of the objects that could be effected by it—they would burst their bonds, and man would in his turn be the victim and the slave.

There is an important faculty, termed *attention*. It is that which distinguishes the promising pupil from him of whom no good hope could be formed, and the scientific man from the superficial and ignorant one. The power of keeping the mind steadily bent upon one purpose is the great secret of individual and moral improvement. We see the habit of attention carried in the dog to a very considerable extent. The terrier eagerly watching for vermin—the sporting dog standing stanch to his point, however he may be annoyed by the blunders of his companion, or the unskilfulness of his master—the foxhound, insensible to a thousand scents, and deaf to every other sound, while he anxiously and perseveringly searches out the track of his prey—these are striking illustrations of the power of attention.

Then, the impression having been received, and the mind having been employed in its examination, it is treasured up in the storehouse of the mind for future use.

This is the faculty of memory, and a most important one it is. Of the *memory* of the dog, and the recollection of kindness received, there are a thousand stories, from the return of Ulysses to the present day, and we have seen enough of that faithful animal to believe most of them. An officer was abroad with his regiment, during the American war. He had a fine Newfoundland dog, his constant companion, whom he left with his family. After the lapse of several years he returned. His dog met him at the door; leaped upon his neck, licked his face, and died.

Of the accuracy and retentiveness of memory in the dog, as respects the instruction he has received from his master, we have abundant proof in the pointer and the hound, and it may perhaps be with some, as with men, that the lesson must sometimes be repeated, and even impressed on the memory in a way not altogether pleasant.

DOG-CARTS.

These were, and still are in the country, connected with many an act of atrocious cruelty. We do not object to the dog as a beast of draught. He is so in the northern regions, and he is as happy as any other animal in those cold and inhospitable countries. He is so in Holland, and he is as comfortable there as any other beast that wears the collar. He is not so in Newfoundland: there he is shamefully treated. It is to the abuse of the thing—the poor, and half-starved condition of the animal; the scandalous weight that he is made to

draw, and the infamous usage to which he is exposed, that we object. We would put him precisely on the same footing with the horse, and then we should be able, perhaps, to afford him, not all the protection we could wish, but nearly as much as we have obtained for the horse. We would have every cart licensed, not for the sake of adding to the revenue, but of getting at the owner; and therefore the taxing need not be any great sum. We would have the cart licensed for the carrying of goods only; or a separate licence taken out if it carried or drew a human being.

It is here that the cruelty principally exists. Before the dog-carts were put down in the metropolis, we then saw a man and a woman in one of these carts, drawn by a single dog, and going at full trot. Every passenger execrated them, and the trot was increased to a gallop, in order the more speedily to escape the just reproaches that proceeded from every mouth. We would have the name and address of the owner, and the number of the cart, painted on some conspicuous part of the vehicle, and in letters and figures as large as on the common carts. Every passenger who witnessed any flagrant act of cruelty would then be enabled to take the number of the cart, and summon the owner; and the police should have the same power of interference which they have with regard to other vehicles.

After a plan like this had been working a little while, the nuisance would be materially abated, and, indeed, the consciousness of the ease with which the offender might be summoned, would go far to get red of it.

CROPPING.

This is an infliction of too much torture for the gratification of a nonsensical fancy; and, after all, in the opinion of many, and of those, too, who are fondest of dogs, the animal looks far better in his natural state than when we have exercised all our cruel art upon him. Besides, the effects of this absurd amputation do not cease with the healing of the ear. The intense inflammation that we have set up materially injures the internal structure of this organ. Deafness is occasionally produced by it in some dogs, and constantly in others. The frequent deafness of the pug is solely attributable to the outrageous as well as absurd rounding of his ears. The almost invariable deafness of the white wire-haired terrier is to be traced to this cause.

TAILING.

Then the tail of the dog does not suit the fancy of the owner. It must be shortened in some of these animals, and taken off altogether in others. If the sharp, strong scissors, with a ligature, were used, the operation, although still indefensible,

would not be a very cruel one, for the tail may be removed almost in a moment, and the wound soon heals; but for the beastly gnawing off of the part—and the drawing out of the tendons and nerves—these are the acts of a cannibal; and he who orders or perpetrates a barbarity so nearly approaching to cannibalism deserves to be scouted from all society.

DEW-CLAWS.

Next comes the depriving of the dog of his *dew-claws*—the supplementary toes a little above the foot. They are supposed to interfere with hunting by becoming entangled with the grass or underwood. This rarely happens. The truth of the matter is, they are simply illustrations of the uniformity of structure which prevails in all animals, so far as is consistent with their destiny. The *dew-claws* only make up the number of toes in other animals. If they are attached, as they are in some dogs, simply by a portion of skin, they may be removed without any very great pain, yet the man of good feeling would not meddle with them. He would not unnecessarily inflict any pain that he can avoid; and here in several of the breeds the toe is united by an actual joint; and if they are dissected because they are a little in the way, it is a barbarous operation and nothing can justify it.

BREAKING-IN.

The cruelties that are perpetrated on puppies during the course of their education or *breaking-in*, are sometimes infamous. Young dogs, like young people, must be to a certain degree coerced; but these animals receive from nature so great an aptitude for learning, and practising that which we require of them, and their own pleasure is so much connected with what they learn, that there is no occasion for one-tenth part of the correction that is occasionally inflicted; and the frequent consequence of the cruelty to which they are subjected, is cowardice or ferocity during life.

Not many years ago, as the author was going over one of the commons in the neighbourhood of the metropolis, now enclosed, he heard the loud sounds of the lash and the screams of a dog. He hurried on, and found two men, one holding a greyhound while another was unmercifully flogging him. He had inflicted many lashes, and was continuing the correction. The author indignantly interfered, and the dog was liberated, but with a great deal of abuse from the men; and a gentleman galloping up, and who was the owner of the dog, and a Middlesex magistrate to boot, seemed disposed to support his people in no very measured terms. On being addressed, however, by name, and recognising the speaker, and his attention being directed to the *whaled* and even bloody state

of the dog, he offered the best excuse that he could. We met again some months afterwards. "That hiding," said he, "that offended you so much, did Carlo good, for he has not been touched since." "No," was the reply; "you were a little ashamed of your fellows, and have altered your system, and find that your dogs do not want this unmerciful negro-whipping."

Stories are told of the *kennel-hare*—a hare kept on purpose, and which is sometimes shown to the fox or staghounds. The moment that any of them open, they are tied up to the whipping-post, and flogged, while the keepers at every stroke call out, "Ware hare!" A sheep has also been shown to them, or still is, after which another unmerciful flogging is administered, amidst cries of "Ware sheep!" If this is not sufficient, some of the wool is dipped in train oil, and put into the dog's mouth, which is sewed up for many hours in order to cure him of sheep-biting. There was an almost similar punishment for killing poultry; and there was the *puzzle* and the *check-collar*, cruelly employed, for killing other dogs.

There is a great deal of truth, and there may occasionally be some exaggeration in these accounts; but the sportsman who is indebted for the pleasures of the field to the intelligence and exertions of his horses and his dogs, is bound, by every principle that can influence an honourable mind, to defend them from all wanton and useless cruelty. There is a dog, and a faithful and valuable one, that powerfully demands the assistance of the humane—the yard or watch-dog. He is not only for the most part deprived of his liberty, but too often neglected and made unnecessarily to suffer. How seldom do we see him in the enjoyment of a good bed of straw, or, rather, how frequently is everything about his kennel in a most filthy and disgusting state! The following hint not only relates to him, but to every dog that is tied up out of doors. "Their cribs or their kennels, as they are called, should be constructed so as to turn, in order to prevent their inmates from being exposed to the cutting blasts of winter. Where they have no other refuge, all animals seek shelter from the weather by turning their backs to the wind; but, as the dog thus confined cannot do so, his kennel should be capable of turning, or at least should be placed so as not to face the weather more than is necessary. The premises would be in quite as great security, for the dog depends as much upon his ear and sense of smell as upon his eye, and would equally detect a stranger's presence if he were deprived of sight."

In the Zoological Gardens, an old blind dog used to be placed at the door of the dissecting-house. Few had any business there, and every one of them he, after a while, used to recognise and welcome full ten yards off, by wagging his

tail; at the same distance, he would begin to growl at a stranger unless accompanied by a friend. From the author's long habit of noticing him, he used to recognise his step before it would seem possible for its sound to be heard. He followed him with his sightless eyes in whatever direction he moved, and was not satisfied until he had patted and fondled him.

DOG-PITS.

Of the demoniacal use of the dog in the *fighting-pits*, and the atrocities that were committed there, I will not now speak. These places were frequented by few others than the lowest of the low. Cruelties were there inflicted that seemed to be a libel on human nature; and such was the baneful influence of the scene, that it appeared to be scarcely possible for any one to enter these pits without experiencing a greater or less degree of moral degradation.

The public dog-pits have now been put down; but the system of dog fighting, with most of its attendant atrocities, still continues. There are many more low public-houses than there used to be pits, that have roomy places behind, and out of sight, where there are regular meetings for this purpose. Those among the neighbours who cannot fail of being annoyed and disgusted by the frequent uproar, might give a clue to these dens of infamy; and the depriving of a few of the landlords of their licence would go a great way towards the effectual suppression of the practice.

Would it be thought possible that certain of our young aristocracy keep fighting-dogs at the repositories of various dealers in the outskirts of the metropolis; and that these animals remain there, as it were, at livery, the owners coming at their pleasure, and making and devising what matches they think proper?

However disgraceful it may be, it is actually the fact. Here is a field for "the suppression of cruelty!"

DOG-STEALING.

The practice of stealing dogs is both directly and indirectly connected with a great deal of cruelty. There are more than twenty miscreants who are well known to subsist by picking up dogs

in the street. There are generally two of them together with aprons rolled round their waists. The dog is caught up at the corner of one of the streets, concealed in a moment in the apron, and the thieves are far away before the owner suspects the loss. These dogs, that have been used to every kind of luxury, are crowded into dark and filthy cellars, where they become infected by various diseases. The young ones have distemper, and the old ones mange, and all become filled with vermin. There they remain until a sufficient reward is offered for their recovery, or they are sent far into the country, or shipped for France or some other foreign market. Little or nothing is done by punishing the inferior rogues in this traffic. The blow must be struck at those of a superior class. I will not assert that every dog-dealer is in league with, and profits by, the lower thieves; but it is true of a great many of them, and it is the principal and most lucrative part of their trade. They are likewise intimately connected with the dog-fights, and encourage them, for the sake of their trade as dealers. An attempt should be made to bring the matter home to these scoundrels.*

* Mr. Bishop, of Bond Street, has assured the public, that he is able to prove that money has recently been extorted from the owners of dogs, by dog-stealers and their confederates, to the amount of more than a thousand pounds. Surely this calls for the decided interposition of the legislature. A strange case of atrocity and cruelty was related by a gentleman to Mr. Bishop. "A young dog of mine," says he, "was lost in London, and, being aware that, if a noise was made about it, a great price would be asked for it, I gave out that I wanted to purchase one. I was shown my own dog. I seized it; but as there were several scoundrels present who professed to belong to it, and threatened to kill the dog if I did not pay for it, I proceeded to describe it as my own, stating that it had *bad back* or *double teeth*. Judge of my surprise, when, after great difficulty, and the dog crying greatly, its mouth was opened, and all the back teeth had been taken out! I paid two pounds for it before they would let me take it away; but, in consequence of the injuries it had received, it died a few days afterwards."

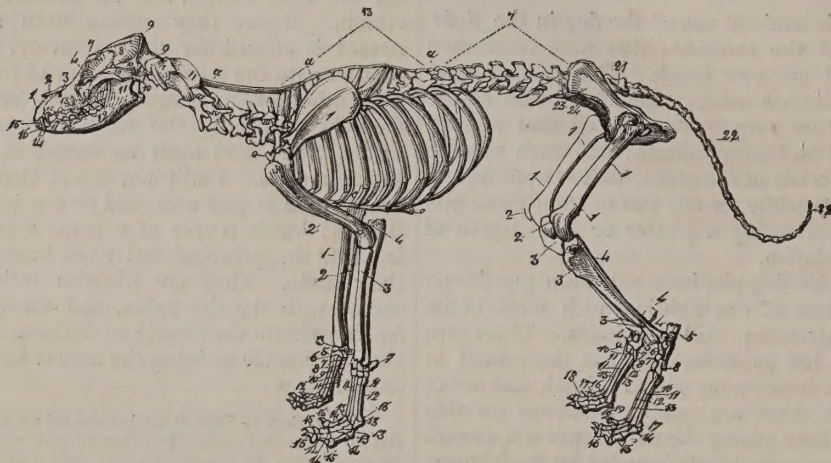
Since the preceding note was written by Mr. Youatt, the subject has been taken up by the legislature, and an act has been passed (8 and 9 Victoria, cap. 47) for the further prevention of Dog-stealing. This act makes the stealing of a dog a misdemeanour punishable, on conviction before two or more justices, by a fine not exceeding twenty pounds, or imprisonment with or without hard labour for not more than six months. The possession of the skin of a stolen dog is also punishable; as is also the compounding for offences under the act, or receiving money for the restoration of a stolen dog. The working of this act has been found on the whole very satisfactory.

THE DOG.

CHAPTER VI.

DESCRIPTION OF THE SKELETON.

DISEASES OF THE NERVOUS SYSTEM:—FITS; TURNSIDE; EPILEPSY; CHOREA; RHEUMATISM AND PALSY.



THE SKELETON OF THE DOG.

THE HEAD AND ITS FUNCTIONS.

- 1 The intermaxillary bone.
- 2 Nasal bone.
- 3, 3 Maxilla superior.
- 4 Lachrymal bone.
- 5 Zygomatic bone.
- 6 Orbit of the eye.
- 7 Frontal bone.
- 8 Summit of the head.
- 9, 9 Occipital bones.
- 10, 10, 10 Temporal bones.
- 11, 11, 11 Inferior maxillary or jaw bones.
- 12, 12 Seven inferior maxillary molar teeth.
- 13, 13 Six molar teeth of the superior jaw.
- 14 Canine teeth of the superior and inferior jaws.
- 15 Three incisor teeth of the superior maxillary bone.
- 16 The three inferior ditto.

THE TRUNK.

- a, a, a The ligamentum nuchæ.
- i. ii. iii. iv. v. vi. vii. The seven vertebræ of the neck.
 - 13 The thirteen dorsal vertebræ.
 - 7 The seven lumbar vertebræ.
 - 21 Os sacrum, or rump-bone.
 - 22, 22 Twenty caudal vertebræ—vertebræ of the tail.
 - 23 The left os innominatum.
 - 24 Right ditto.
- The nine true ribs, with their cartilages.
The four false ribs, with their cartilages.
o The sternum.

THE LEFT ANTERIOR EXTREMITY.

- 1 The scapula, or shoulder-blade.
- 2, 2 Os humeri, or shoulder.
- 3, 3 Radius—the lesser bone of the arm.
- 4, 4 Ulna—the elbow.
- 5 Os naviculare—the navicular bone.
- 6 Os triquetrum, or triangulare.

- 7 Os pisiforme, or pisiform bone.
- 8 Os semilunare, or semilunar bone.
- 9 Os capitulum—the nail.
- 10 Os metacarpi digiti tertii—the third metacarpal bone
- 11 Os metacarpi digiti quarti—fourth metacarpal.
- 12 Os metacarpi digiti quinti.
- 13, 13, 13 The first digits of the fore-feet.
- 14, 14, 14 The second ditto.
- 15 The third ditto.
- 16 The sesamoid bone.

THE RIGHT ANTERIOR EXTREMITY

- 1, 1 Radius.
- 2 Ulna—elbow.
- 3 Os triquetrum—the triangular bone.
- 4 Os naviculare—the navicular bone.
- 5 Os semilunare—the semilunar bone.
- 6 Os multangulum majus—the larger multangular bone.
- 7 Os multangulum minus—the small multangular bone.
- 8 Os metacarpi pollicis—the thumb.
- 9 Ossa metacarpi digitorum quatuor—the four bones of the metacarp.
- 10 Phalanx prima pollicis—first phalange of the thumb.
- 11 Phalanx tertia pollicis—third phalange of ditto.
- 12 Digni quatuor—fourth phalange of ditto.

THE LEFT POSTERIOR EXTREMITY.

- 1, 1 Os femoris—thigh-bone.
- 2, 2 Patella—the knee-pan.
- 3, 3 Tibia—the shank of the leg.
- 4, 4 Fibula—the small bone of ditto.
- 5 Calcæreus—the heel.
- 6 Astragalus—one of the seven bones of the tarsus.
- 7 Os naviculare—the navicular bone.
- 8 Os cuboideum—or cubic bone.
- 9 Os cuneiforma tertium et maximum.
- 10 Os metatarsi digiti quarti.
- 11 Os metatarsi digiti tertii.

- 12 Os metatarsi digiti secundi.
- 13 Os metatarsi digiti primi.
- 14 Phalanges primæ digitorum pedis.
- 15 Phalanges secundæ.
- 16 Phalanges tertiæ.
- 17 Os sesamoideum—the sessamoid.

THE RIGHT POSTERIOR EXTREMITY.

- 1 Os femoris—the thigh-bone.
- 2 Patella—the knee-pan.
- 3 Tibia—the shank of the leg.
- 4 Calcæus—the heel.
- 5 Astragalus—one of the seven bones of the tarsus.
- 7 Os naviculare—the navicular bone.
- 8 Os cuneiforma primum et medium.
- 9 Os cuboideum, or cubic bone.
- 10 Os cuneiforma tertium et maximum.
- 11 Os cuneiforma secundum et minimum.
- 12 Radimentum ossis metatarsi hallucis.
- 13 Os metatarsi digiti primi.
- 14 Os metatarsi digiti secundi.
- 15 Os metatarsi digiti tertii.
- 16 Phalanges primæ digitorum pedis.
- 17 Phalanges secundæ.
- 18 Phalanges tertiæ.
- 19 Os sesamoideum—the sessamoid.

DISEASES OF THE NERVOUS SYSTEM.

FITS.

24th Feb., 1814.—A pug was accustomed to howl frequently when his young master played on the flute. If the higher notes were sounded, he would leap on his master's lap, look in his face, and howl vehemently. To-day the young man purposely blew the shrillest sound that he could. The dog, after howling three or four times, began to run round the room, and over the tables and chairs, barking incessantly. This he continued more than an hour.

When I saw him, all consciousness of surrounding objects was gone. He was still running feebly, but barking might and main.

I dashed a basin of cold water in his face, and he dropped as if he had been shot. He lay motionless nearly a minute, and then began to struggle and to bark; another cup of water was dashed in his face, and he lay quite motionless during two minutes or more. In the meantime I had got a grain each of calomel and tartar emetic, which I put on his tongue, and washed it down with a little water. He began to recover, and again begun to yelp, although much softer; but in about a quarter of an hour sickness commenced, and he ceased his noise. He vomited three or four times, and lay frightened and quiet. A physic-ball was given him in the evening, and on the following morning.

On the next day, the young man put open the door, and sat himself down, and began to prepare the flute; the dog was out in a moment, and did not return during a couple of hours. On the following day he made his escape again, and so the matter went on; but, before the expiration of the week, his master might play the flute if he pleased.

TURN-SIDE, OR GIDDINESS.

This is a singular disease prevalent among cattle, but only occasionally seen in the dog. He becomes listless, dull, off his food, and scarcely recognises any surrounding object. He has no fit, but he wanders about the room for several hours at a time, generally or almost invariably in the same direction, and with his head on one side. At first he carefully avoids the objects that are in his way; but by degrees his mental faculties become impaired; his sense of vision is confused or lost, and he blunders against everything: in fact, if uninterrupted, he would continue his strange perambulation incessantly, until he was fairly worn out, and died in convulsions.

I used to consider the complaint to be uniformly fatal. I have resorted to every remedial measure that the case could suggest. I have bled, and physicked, and setoned, and blistered, and used the moxa; but all without avail, for not in a single case did I save my patient.

No opportunity of *post-mortem* examination was lost. In some cases I have found spicula projecting from the inner plate of the skull, and pressing upon or even penetrating the dura mater. I know not why the dog should be more subject to these irregularities of cranial surface than any of our other patients; but decidedly he is so, and where they have pressed upon the brain there has been injection of the membranes, and sometimes effusion between them.

In some cases I have found effusion without this external pressure, and, in some cases, but comparatively few, there has not been any perceptible lesion. Hydatids have been found in the different passages leading to the cranium, but they have not penetrated.

I used to recommend that the dog should be destroyed; but I met with two or three favourable cases, and, after that, I determined to try every measure that could possibly be serviceable. I bled, and physicked, and inserted setons, and tried to prevent the utter exhaustion of the animal. When he was unable longer to perform his circumvolutions, and found that he was foiled, he laid himself down, and by degrees resumed his former habits. He was sadly impatient and noisy; but in a few cases he was cured.

EPILEPSY

in the dog assumes a most fatal character. It is an accompaniment, or a consequence, of almost every other disease. When the puppy is undergoing the process of dentition, the irritation produced by the pressure of the tooth, as it penetrates the gum, leads on to epilepsy. When he is going through the stages of distemper, with a very little bad treatment, or in spite of the best, fits occur.

The degree of intestinal irritation which is caused by worms, is marked by an attack of epilepsy. If the usual exercise be neglected for a few days, and the dog is taken out, and suffered to range as he likes, the accumulation of excitability is expended in a fit.

The dog is, without doubt, the most intellectual animal. He is the companion and the friend of man; he exhibits, and is debased by some of his vices; but, to a greater degree than many will allow, he exhibits all the intelligence and the virtues of the biped. In proportion to his bulk, the weight of his brain far exceeds that of any other quadruped—the very smallest animals alone being excepted, in whom there must be a certain accumulation of medullary matter in order to give origin to the nerves of every system, as numerous in the minutest as in him of greatest bulk.

As it has been said of the human being that great power and exertion of the mental faculties are sometimes connected with a tendency to epilepsy, and, as violent emotions of joy or of grief have been known to be followed by it, I can readily account for its occurrence in the young dog, when frightened at the chiding of his master, or by the dread of a punishment which he was conscious that he had deserved. Then, too, I can understand that, when breaking loose from long confinement, he ranges in all the exuberance of joy; and especially when he flushes almost his first covey, and the game falls dead before him, his mental powers are quite overcome, and he falls into an epileptic fit.

The treatment of epilepsy in the dog is simple, yet often misunderstood. It is connected with distemper in its early stage. It is the produce of inflammation of the mucous passages generally, which an emetic and a purgative will probably, by their direct medicinal effect, relieve, and free the digestive passages from some source of irritation, and by their mechanical action unburthen the respiratory ones.

When it is symptomatic of a weak state of the constitution, or connected with the after stages of distemper, the emeto-purgative must be succeeded by an anodyne, or, at least, by that which will strengthen, but not irritate the patient.

A seton is an admirable auxiliary in epilepsy connected with distemper; it is a counter-irritant and a derivative, and its effects are a salutary discharge, under the influence of which inflammation elsewhere will gradually abate.

I should, however, be cautious of bleeding in distemper fits. I should be fearful of it even in an early stage, because I well know that the acute form of that general mucous inflammation soon passes over, and is succeeded by a debility, from the depression of which I cannot always rouse my patient. When the fits proceed from dentition, I lance the jaws, and give an emetic, and follow it

up with cooling purgative medicine. When they are caused by irregular and excessive exercise, I open the bowels and make my exercise more regular and equable. When they arise from excitation, I expose my patient more cautiously to the influence of those things which make so much impression on his little but susceptible mind.

If the fit has resisted other means, bleeding should be resorted to. A fit in other animals is generally connected with dangerous determination of blood to the head, and bleeding is imperative. A fit in the dog may be the consequence of sudden surprise and irritation. If I had the means I should see whether I could not break the charm; whether I could not get rid of the disturbance, by suddenly affecting the nervous system, and the system generally, in another way. I would seize him by the nape of the neck, and, with all my force, dash a little cold water in his face. The shock of this has often dispersed the epileptic agency, as it were by magic. I would give an emeto-purgative; a grain or a grain and a half of calomel and the same quantity of tartar-emetic: I would soothe and coax the poor animal. Then—and if I saw it at the beginning, I would do it early—if the fit was more dependent upon, or was beginning to be connected with, determination of blood to the head, and not on any temporary cause of excitation or irritation, I would bleed freely from the jugular.

The following singular case of epilepsy is narrated by M. W. Leblanc:—

A dog of small size, three years old, was very subject to those epileptic fits that are so frequent among dogs. After a considerable period, the fits would cease, and the animal recover the appearance of perfect health; but the more he advanced in age the more frequent were the fits, which is contrary to that which usually happens.

The last fit was a very strong one, and was followed by peculiar symptoms. The animal became dispirited. The eyes lost their usual lively appearance, and the eyelids were often closed. The dog was very drowsy, and, during sleep, there were observed, from time to time, spasmodic movements, principally of the head and chest. *He always lay down on the left side.* When he walked, he had a marked propensity to turn to the left.

M. Leblanc employed purgatives, a seton to the back part of the neck, and the application of the cauterium to the left side of the forehead; but nothing would stop the progress of the disease, and he died in the course of two months after the last fit. The nearer he approached his end the smaller were the circles that he took; and, in the latter part of his existence, he did little more than turn as if he were on a pivot, and, when the time arrived that he could walk no more, he used to lay himself down on the right side.

On the *post-mortem* examination, a remarkable thickness of the meninges was found on almost the whole of the left lobe of the brain. The dura mater, the two leaves of the arachnoid membrane, and the pia matter did not constitute more than one membrane of the usual thickness, and presented a somewhat yellow colouring. The cerebral substance of the left lobe appeared to be a little firmer than that of the right lobe. The fissures of the cerebral convolutions were much less deep than those of the other side. The red vessels which ran in the fissures were of smaller size, and in some places could scarcely be discovered.

CHOREA.

This is an irregular reception or distribution of nervous power—a convulsive involuntary twitching of some muscle or set of muscles. It is an occasional consequence of distemper that has been unusually severe or imperfectly treated, and sometimes it is seen even after that disease has existed in its mildest form.

It first appears in one leg or shoulder, and is long, or perhaps entirely, confined to that limb. There is a singular spasmodic jerking action of the limb. It looks like a series of pulsations, and averages from forty to sixty in a minute. Oftener, perhaps, than otherwise, both legs are similarly affected. When the animal is lying down, the legs are convulsed in the way that I have described, and when he stands there is a pulsating depression or sinking of the head and neck. In some cases, the muscles of the neck are the principal seat of the disease, or some muscle of the face; the temporal muscle beating like an artery; the masseter opening and closing the mouth, the muscles of the eyelid, and, in a few cases, those of the eye itself being affected. These convulsive movements generally, yet not uniformly, cease during sleep, but that sleep is often very much disturbed. If the case is neglected, and the dog is in a debilitated state, this spasmodic action steals over the whole frame, and he lies extended with every limb in constant and spasmodic action.

In the majority of cases, such an expenditure of nervous and muscular power slowly destroys the strength of the animal, and he dies a mere skeleton; or the disease assumes the character of epilepsy, or it quiets down into true palsy.

In the most favourable cases, no curative means having been used, the dog regains his flesh and general strength; but the chorea continues, the spasmodic action, however, being much lessened. At other times, it seems to have disappeared; but it is ready to return when the animal is excited or attacked by other disease. In a variety of instances, there is the irritable temper which accompanies chorea in the human being, and most certainly

when the disease has been extensive and confirmed.

Chorea, neglected or improperly treated, or too frequently pursuing its natural course, degenerates into paralysis agitans. There is a tremulous or violent motion of almost every limb. The spasms are not relaxed, but are even increased during sleep, and when the animal awakes, he rises with agitation and alarm. There is not a limb under the perfect control of the will; there is not a moment's respite; the constitution soon sinks, and the animal dies. No person should be induced to undertake the cure of such a case: the owner should be persuaded to permit a speedy termination to a life which no skill can render comfortable.

Chorea is oftenest observed in young dogs, and especially after distemper; and it seems to depend on a certain degree of primary or sympathetic inflammatory affection of the brain.

Chorea is often very plainly a consequence of debility: either the distribution of nervous power is irregular, or the muscles have lost their power of being readily acted upon, or have acquired a state of morbid irritability. The latter is the most frequent state. Their action is irregular and spasmodic, and it resembles the troubles of expiring nature far more than the great and uniform action of health. It is not the chorea that used to be described, in which there was an irresistible impulse to excessive action, and which was best combated by complete muscular exhaustion; but the foundation of this disease is palpable debility.

In the treatment of chorea there must be no bleeding, no excessive purgation, but aperients or alteratives, merely sufficient to keep the fæces in a pultaceous state, so as to carry off any source of irritation to the intestinal canal, and particularly some species of worms, too frequent sources of irritation there. To these should be added nutritious food, gentle exercise, tonic medicines, and general comforts. Counter-irritants may be applied—such as blisters over the head, and setons, extending from poll to poll—the application of turpentine, or the tincture of cantharides; but all of these will frequently be of no effect, and occasionally a rapid and fearful increase of irritability will ensue: antispasmodics are in this case of no use, and narcotics are altogether powerless. As for tonics, iron and gentian have been serviceable to a certain extent, but they have never cured the complaint. The nitrate of silver will be the sheet-anchor of the practitioner, and if early used will seldom deceive him. It should be combined with ginger, and given morning and night, in doses varying from one-sixth to one-third of a grain, according to the size of the dog.

The condition and strength of the dog, and the season of year, will be our best guides. If the

patient has not lost much flesh, *and is not losing* it at the time that we have to do with him, and has few symptoms of general debility, and spring or summer are approaching, we may with tolerable confidence predict a cure; but, if he has been rapidly losing ground, and is doing so still, and staggers about and falls, there is no medicine that will restore him.

5th October, 1840.—A pointer, eighteen months old, had had the distemper, but not severely, and was apparently recovering, when he suddenly lost all voluntary power over his limbs. He was unable to get up, and his legs were in constant, rapid, and violent motion. This continued three days, during which he had refused all food, when, the dog being in the country, my advice was asked. I ordered a strong emetic to be given to him, and after that a dose of Epsom Salts, the insertion of a seton, and, in addition to this, our usual tonic was to be given twice every day. His food to consist chiefly of good strong soup, which was to be forced upon him in a sufficient quantity.

In two days he was able to get up and stagger about, although frequently falling. His appetite returned. He continued to improve, and most rapidly gained strength and especially flesh. A very peculiar, high-lifting, clambering, and uncertain motion of the legs remained, with an apparent defect of sight, for he ran against almost everything.

In six weeks the seton was removed, and the dog remained in the same state until the 7th of December. The uncertain clambering motion was now increasing, and likewise the defect of sight. He ran against almost every person and every thing. The cornea was transparent, the iris contracted, there was no opacity of the lens, or pink tint of the retina, but a peculiar glassy appearance, as unconscious of everything around it. An emetic was given, and after that, an ounce of sulphate of magnesia.

8th. He was dreadfully ill after taking the salts; perhaps they were not genuine. For two days he panted sadly, refused his food, and vomited that which was forced upon him. His muzzle was hot; he could scarcely stand; he lost flesh very rapidly. An emetic was given immediately, and a distemper-ball daily.

16th. He soon began rapidly to recover, until he was in nearly the same state as before, except that the sight was apparently more deficient. The sulphate of magnesia was given every fourth day, and another seton inserted.

21st. He continued the medicine and evidently improved, the sight returning, and the spasms being considerably less. The distemper-ball was continued.

4th January, 1841.—The spasms were better; but the vision did not improve. In the afternoon

he fell into a momentary fit. He almost immediately rose again, and proceeded as if nothing had happened. An ounce of Epsom salts was given, and then the tonic balls as before.

22nd. The spasms were lessened, the clambering gait nearly ceased, but the vision was not improved. The seton was removed, and only an additional dose of salts given.

27th. The spasms suddenly and very considerably increased. The left side appeared now to be particularly affected. The left leg before and behind were most spasmed, the right scarcely at all so. The vision of the left eye was quite gone. The dog had been taken to Mr. Alexander's, the oculist, who attributed the affection of the eye and the general spasmodic disease to some pressure on the brain, and recommended the trial of copious and repeated bleeding.

28th. The dog was dull; the spasms appeared to have somewhat increased, and decidedly to affect the left side. Fever-balls were ordered to be given.

29th. Considerable change took place. At three o'clock this morning I was disturbed by a noise in the hospital. The poor fellow was in a violent fit. Water was dashed in his face, and a strong emetic given; but it was not until seven o'clock that the fit had ceased; he lay until eleven o'clock, when the involuntary spasms were almost suspended. When he was placed on his feet he immediately fell; he then gradually revived and staggered about. His master brought a physician to see him, who adopted Mr. Alexander's idea and urged bleeding. Ten ounces of blood were immediately taken; the dog refused to eat.

1st February.—The strength of the animal was not impaired, but the spasms were more violent, and he lay or wandered about stupid and almost unconscious. I subtracted eight ounces more of blood.

2nd. The spasms were fully as violent, and no amendment in the vision. Eight ounces more of blood were subtracted without benefit. A fever-ball was ordered to be given.

3rd. No amendment; but the bleeding having been carried to its full extent, I again resorted to the tonic balls, which were given morning and night. The dog was well fed and the seton replaced.

5th. A very considerable amendment is evident.

9th. The spasms rapidly subsided and almost disappeared. Vision was not perfectly restored; but the dog evidently saw with his left eye. He was taken away, and tonic balls sent with him and ordered to be continued.

6th March.—The dog had improved in strength and no spasmodic affection remained; he likewise evidently saw with his left eye. The tonic balls

had been discontinued for a week, and his master hoped that all would turn out well, when suddenly, while at home, he was seized with a fit that lasted ten minutes. A strong emetic was given, which brought up a vast quantity of undigested food. A strong purging-ball was given to him in the evening.

13th. The dog had lain slightly spasmed for two or three days, when they all at once ceased, and the animal appeared as well as before. Suddenly he was taken with another fit, and again a vast quantity of food was vomited. These spasms remained two days, but on the 21st the fit returned with the same discharge of food. Courses of purgatives were then determined on. A strong dose of sulphate of magnesia was given every third day. After four doses had been given it was impossible to force any more upon him. The syrup of buckthorn was tried, but the fourth dose of that it was impossible to give. The dog was then sent into the country; no fit occurred, but there were occasional spasms.

23rd September.—He was brought back to town, and I saw him. During the last month he had had many fits. His owner at length consented that the actual cautery should be applied to his head. The searing-iron for doctoring was used, and applied red-hot to the centre of the head. It was exceedingly difficult so to confine the dog as to make the application effectual, without destroying the skin.

Under the influence of the sudden violent pain, he wandered about for more than two hours, and then the spasms returned with greater force than usual. He refused all food.

We determined to try the cautery to its full extent. We chained him up in the morning, and penetrated through the skin with the budding-iron. The spasms were dreadfully violent, and he was scarcely able to walk or to stand. This gradually subsided, and then he began to run round and round, and that increased to an extraordinary velocity: he would then lie for a while with every limb in action. The owner then yielded to all our wishes, and he was destroyed with prussic acid. No morbid appearance presented itself in the brain; but, on the inner plate of the right parietal bone, near the sagittal suture, were two projections, one-sixth of an inch in length, and armed with numerous minute spicula. There was no peculiar inflammation or vascularity of any other part of the brain.

RHEUMATISM AND PALSY.

I do not know any animal so subject to *rheumatism* as the dog, nor any one in which, if it is early and properly treated, it is so manageable. A warm bath—perchance a bleeding—a dose or two of the castor-oil mixture, and an embrocation

composed of spirit of turpentine, hartshorn, camphorated spirit, and laudanum, will usually remove it in two or three days, unless it is complicated with muscular sprains, or other lesions, such as the *chest-founder* of kennels.

This chest-founder is a singular complaint, and often a pest in kennels that are built in low situations, and where bad management prevails. Where the huntsman or whippers-in are too often in a hurry to get home, and turn their dogs into the kennel panting and hot; where the beds are not far enough from the floor, or the building, if it should be in a sufficiently elevated situation, has yet a northern aspect, and is unsheltered from the blast, chest-founder prevails; and I have known half the pack affected by it after a severe run, the scent breast-high, and the morning unusually cold. It even occasionally passes on into palsy.

The veterinary surgeon will be sometimes consulted respecting this provoking muscular affection. His advice will comprise—dryness, attention to the bowels, attention to the exercise-ground, and perhaps, occasionally, setons—not where the huntsman generally places them, on the withers above, but on the brisket below, and defended from the teeth of the dog by a roller of a very simple construction, passing round the chest between the fore legs and over the front of the shoulders on either side.

The pointer, somewhat too heavy before, and hardly worked, becomes what is called chest-foundered. From his very make it is evident that, in long-continued and considerable exertion, the subscapular muscles will be liable to sprain and inflammation. There will be inflammation of the fasciæ, induration, loss of power, loss of nervous influence, and palsy. Cattle, driven far and fast to the market, suffer from the same cause. Palsy is frequent, as in the dog. However easy it may be to subdue a rheumatic affection in its early stage, by prompt attention, yet if it is neglected, it very soon simulates, or becomes essentially connected with, or converted into, palsy.

No animal presents a more striking illustration of the connexion between intestinal irritation and palsy than does the dog. He rarely or never has enteritis, even in its mildest form, without some loss of power over the hinder extremities. This may at first arise from the participation of the lumbar muscles with the intestinal irritation; but, if the disease of the bowels continues long, it will be evident enough that it is not pain alone that produces the constrained and incomplete action of the muscles of the hind extremities, but that there is an actual loss of nervous power. A dog is often brought to the veterinary surgeon, with no apparent disease about him except a staggering walk from

weakness of the hind limbs. He eats well and is cheerful, and his muzzle is moist and cool; but his belly is tucked up, and there are two longitudinal chords, running parallel to each other, which will scarcely yield to pressure. The surgeon orders the castor-oil mixture twice or thrice daily, until the bowels are well acted upon, and, as soon as that is accomplished, the dog is as strong and as well as ever. Perhaps his hind limbs are dragged behind him: a warm bath is ordered, he is dosed well with the castor-oil mixture, and, if it is a recent case, the animal is well in a few days. In more confirmed palsy, the charge, or plaster on the loins, is added to the action of the aperient on the bowels. The process may be somewhat slow, but it is seldom that the dog does not ultimately and perfectly recover.

It is easy to explain this connexion, although we should have scarcely supposed that it would have been so intimate, had not frequent experience forced it on our observation. The rectum passes through the pelvis. Whatever may be said of that intestine, considering its vertical position in the human being, it is always charged with fæces in the quadruped. It therefore shares more in the effect, whatever that may be, which is produced by the retention of fæces in the intestinal canal, and it shares also in the inflammatory affection of other parts of the canal. Almost in contact with this viscus, or at least passing through the pelvis, are the crural nerves from the lumbar vertebræ, the obturator running round the rim of the pelvis, the glutal nerve occupying its back, and the sciatic hastening to escape from it. It is not difficult to imagine that these, to a certain degree, will sympathize with the healthy and also the morbid state of the rectum; and that, when it is inert, or asleep, or diseased, they also may be powerless too. Here is something like fact to establish a very important theory, and which should be deeply considered by the sportsman and the surgeon.

Mr. Dupuy has given a valuable account of the knowledge we possess of the diseases of the spinal marrow in our domestic quadrupeds.

He has proved—

1. That in our domestic animals the spinal marrow is scarcely ever affected through the whole of its course.
2. That the dorsal and lumbar regions are the parts oftenest affected.
3. That inflammation of the spinal marrow of these regions always produces palsy, more or less complete, of the abdominal members.
4. That, in some cases, this inflammation is limited to the inferior or superior parts of the spinal marrow, and that there is loss only of feeling or of motion.
5. That sometimes animals die of palsy without any organic lesion.

PALSY—MANGE.

11th February, 1836.—A Persian bitch, at the Zoological Gardens, who was well yesterday, now staggers as she walks, and has nearly lost the use of her hind legs. Gave a good dose of the castor-oil mixture. 18th. She is materially worse and drags her hind legs after her. I would fain put on a charge, but the keeper does not like that her beautiful coat should be spoiled, and wishes to try what gentle exercise will do. She certainly, after she has been coaxed a great deal, will get on her legs and stagger on fifty yards or more. Gave the castor-oil mixture daily. 19th. She is a little stronger, and walks a little better. Continue the mixture. Embrocate well with the rheumatic mixture—*sp. tereb.*, *sp. camph.*, *liq. ammon.*, *et tinct. opii*—and give gentle exercise.

2nd March.—She does improve, although slowly; the charge is therefore postponed. Continue treatment. 30th. She is considerably better. Continue the mixture, and use the embrocation every second day.

10th April.—She has mange in the bend of her arm, and on her chest. Use the sulphur ointment and alterative balls, and omit the embrocation and mixture. In less than a week she nearly recovered from her lameness, and ran about almost as well as ever. 30th. She runs about very fairly, but the mange has assumed that character of scurvy which I do not know how to grapple with. Continue the alterative balls, and the ointment.

18th May.—The mange has disappeared, but the palsy is returning; she staggers slightly, and droops behind. Give the castor-oil mixture and use the embrocation.

14th June.—Mange quite gone, but palsy continues to a very considerable degree. I want to use the plaster; but the keeper pleads for a little delay. Continue the treatment.

1st July.—I have at length determined to have recourse to the charge. A piece of thick sheep's leather was fitted to her loins and haunches. 18th. She appears to be improving, but it is very slowly. 31st. Very little change. The plaster keeps on well: she has no power over her hind limbs; but she eats and drinks as well as ever.

23rd August.—No change. Give her half a grain of strychnia, morning and night. 26th. That singular secretion of milk, to which the bitch is subject nine weeks after œstrum, is now appearing. Her mammae are enlarged, and I can squeeze a considerable quantity of milk out of the teats. Give an aloetic pill, and continue the strychnia. 31st. The secretion of milk continues. There is slight enlargement and some heat of the mammae; but she feeds as well as ever. Increase the dose of strychnia to three-quarters of a grain.

On the following day she was found dead. In

making the usual longitudinal incision through the integuments of the abdomen, a considerable quantity of milky fluid, mingled with blood, followed the knife. There was very slight enlargement of the teats, but intense inflammation of the whole of the mammary substance. The omentum, and particularly the portion opposite to the external disease, was also inflamed. Besides this there was not a vestige of disease.

This is an interesting case, and deserves record. I fear that justice was not done to the animal at the commencement of the paralytic affection. In nineteen cases out of twenty in the dog, the constant but mild stimulus of a charge over the lumbar and sacral regions removes the deeper-seated inflammation of the spinal cord or its membranes, when the palsy is confined to the hind extremities, and has not been sufficiently long established to produce serious change of structure. The charge should have been applied at first. The almost total disappearance of the palsy during the cutaneous disease, which was attended with more than usual inflammation of the integument, is an instructive illustration of the power of counter-irritation, and of what might possibly have been effected in the first case; for much time was lost before the application of the charge, and when at length it was applied, it and the strychnia were powerless.

I consider the following case as exceedingly valuable, at least with reference to the power of strychnia in removing palsy:—

19th August, 1836.—A fine Alpine dog was suddenly attacked with a strange nervous affection. He was continually staggering about and falling. His head was forcibly bent backward and a little

on one side, almost to his shoulder. A pound of blood was abstracted, a seton inserted from ear to ear, and eight grains of calomel administered. 21st. He has perfectly lost the use of every limb. He has also amaurosis, perfect blindness, which had not appeared the day before. He hears perfectly, and he eats and with appetite, when the food is put into his mouth. Gave him two large spoonfuls of the castor-oil mixture daily; this consists of three parts of castor oil, two of syrup of buck-thorn, and one of syrup of white poppies. 23rd. A little better; can lift his head and throw it upon his side, and will still eat when fed. Continue the mixture, and give half a grain of strychnia daily. 24th. Little change. 27th. No change, except that he is rapidly losing flesh. Continue the treatment. 31st. The strychnia increased to three-fourths of a grain morning and night. The castor-oil mixture continued in its full quantity. He was fed well, but there was a sunken, vacant expression of countenance.

2nd September.—He can move his head a little, and has some slight motion in his limbs. 4th. He can almost get up. He recognises me for the first time. His appetite, which was never much impaired, has returned; this is to be attributed to strychnia, or the seton, or the daily aperient mixture. They have all, perhaps, been serviceable, but I attribute most to the strychnia; for I have rarely, indeed, seen any dog recover from such an attack. Continue the treatment. 6th. Fast recovering. Medicine as before. 14th. Improving, but not so fast as before. Still continue the treatment. 28th. Going on slowly, but satisfactorily. Remove the seton, but continue the other treatment.

13th October.—Quite well.

CHAPTER VII.

RABIES.

WE are now arrived at one of the most important subjects in veterinary pathology. In other cases the comfort and the existence of our quadruped patients are alone or chiefly involved, but here the lives of our employers, and our own too, are at stake, and may be easily, and too often are, compromised. Here also, however other portions of the chain may be overlooked or denied, we have the link which most of all connects the veterinary surgeon with the practitioner of human medicine; or, rather, here is the circumscribed but valued spot where the veterinary surgeon has the vantage-ground.

In describing the nature, and cause, and treatment of rabies, it will be most natural to take the animal in which it oftenest appears, by which it is

most frequently propagated; the time at which the danger commences, and the usual period before the death of the patient.

Some years ago a dog, naturally ferocious, bit a child at Lisson Grove. The child, to all appearance previously well, died on the third day, and an inquest was to be held on the body in the evening. The coroner ordered the dog to be sent to me for examination. The animal was, contrary to his usual habit, perfectly tractable. This will appear to be of some importance hereafter. I examined him carefully. No suspicious circumstance could be found about him. There was no appearance of rabies. In the mean time the inquest took place, and the corpse of the child was carefully examined. One medical gentleman thought that there were

some suspicious appearances about the stomach, and another believed that there was congestion of the brain.

The owner of the dog begged that the animal might not be taken from him, but might accompany him home. He took him home and destroyed him that no experiments might be made.

With great difficulty we procured the carcase, and from some inflammatory appearances about the tongue and the stomach, and the presence of a small portion of indigestible matter in the stomach, we were unanimously of opinion that the dog was rabid.

I do not mean to say that the child died hydrophobous, or that its death was accelerated by the nascent disease existing in the dog. There was probably some nervous affection that hastened the death of the infant, and the dog bit the child at the very period when the malady first began to develop itself. On the following day there were morbid lesions enough to prove beyond doubt that he was rabid.

This case is introduced because I used afterwards to accompany every examination of supposed or doubtful rabies with greater caution than I probably had previously used.

It is occasionally very difficult to detect the existence of rabies in its nascent state. In the year 1813, a child attempted to rob a dog of its morning food, and the animal resisting the theft, the child was slightly scratched by its teeth. No one dreamed of danger. *Eight days afterwards* symptoms of rabies appeared in the dog, the malady ran its course, and the animal died. A few days afterwards the child sickened—undoubted characteristics of rabies were observed—they ran their course, and the infant was lost.

There are other cases—fortunately not numerous—in the records of human surgery, resembling this. A person has been bitten by a dog, he has paid little or no attention to it, and no application of the caustic has been made. Some weeks, or even months, have passed, he has nearly or quite forgotten the affair, when he becomes languid and feverish, and full of fearful apprehensions, and this appearing perhaps during several days, or more than a week. The empoisonment has then ceased to be a local affair, the virus has entered into the circulation, and its impression is made on the constitution generally. Fortunately the disposition to bite rarely develops itself until the full establishment of the disease, otherwise we might sometimes inquire whether it were not our duty to exterminate the whole race of dogs.

The following case deserves to be recorded:—On the 21st of October, 1813, a dog was brought to me for examination. He had vomited a considerable quantity of coagulated blood. I happened to be particularly busy at the moment, and not

observing anything peculiar in his countenance or manner, I ordered some astringent sedative medicine, and said that I would see him again in the afternoon.

In the course of the afternoon he was again brought. The vomiting had quite ceased. His mouth seemed to be swollen, and, on examining him, I found that some of his incisor teeth, both in the upper and lower jaw, had been torn out. This somewhat alarmed me; and, on inquiring of the servant, I was told that he suspected that they had had thieves about the house on the preceding night; for the dog had torn away the side of his kennel in attempting to get at them. I scolded him for not having told me of this in the morning; and then, talking of various things in order to prolong the time and to be able closely to watch my patient, I saw, or I thought I saw, but in a very slight degree, that the animal was tracing the fancied path of some imaginary object. I was then truly alarmed, and more especially since I had discovered that in the giving of the physic in the morning the man's hand had been scratched; a youth had suffered the dog to lick his sore finger, and the animal had also been observed to lick the sore ear of an infant. He was a remarkably affectionate dog, and was accustomed to this abominable and inexcusable nonsense.

I insisted on detaining the dog, and gave the man a letter to the surgeon, telling him all my fears. He promptly acted on the hint, and before evening, the proper means were taken with regard to all three.

I watched this dog day after day. He would not eat, but he drank a great deal more water than I liked. The surgeon was evidently beginning to doubt whether I was not wrong, but he could not dispute the occasional wandering of the eye, and the frequent spume upon the water. On the 26th of October, however, the sixth day after his arrival, we both of us heard the rabid howl burst from him; he did not, however, die until the 30th. I mention this as another instance of the great difficulty there is to determine the real nature of the case in an early stage of the disease.

M. Perquin relates an interesting case. A lady had a greyhound, nine years old, that was accustomed to lie upon her bed at night, and cover himself with the bed-clothes. She remarked, one morning, that he had torn the covering of his bed, and, although he eat but little, drank oftener, and in larger quantity, than he was accustomed to do. She led him to a veterinary surgeon, who assured her that there was nothing serious the matter. On the following day, he bit her fore-finger near the nail, as she was giving him something to eat. She led him again to the veterinary surgeon, who assured her that she needed not to be under the least alarm, and, as for the little wound on her

finger, it was of no consequence. On the following day, the 27th of December, the dog died. He had not ceased to drink most abundantly to the very last.

On the 4th of February, as the lady was dining with her husband, she found some difficulty in deglutition. She wished to take some wine, but was unable to swallow it.

On the 5th, she consulted a surgeon. He wished her to swallow a little soup in his presence. She attempted to do it, but could not accomplish her object after many an effort. She then fell into a state of violent agitation, with constriction of the pharynx, and the discharge of a viscid fluid from the mouth.

On the 7th, she died, four days after the first attack of the disease, and in a state of excessive loss of flesh.

There can be no doubt that both the dog and his mistress died rabid, the former having communicated the disease to the latter; but there is no satisfactory account of the manner in which the dog became diseased.*

Joseph Delmaire, of Looberghe, twenty-nine years old, was, on the 6th of October, 1836, bitten in the hand by a dog that he met with in the forest, and that was evidently rabid. On the following morning, he went to a medical man of some repute in the country, who washed the wound, and scarified it, and terminated the operation by tracing a bloody cross on the forehead of the patient.

He returned home, but he was far from being satisfied. The image of the dog that had attacked him was always before him, and his sleep was troubled with the most frightful dreams. So passed four-and-twenty days, when Delmaire, rising from his bed, felt the most dreadful trepidation—he panted violently—it seemed as if an enormous weight oppressed his chest, and from time to time there was profound sighing and sobbing. He complained every moment that he was smothered. He attempted to drink, but it was with great difficulty that a few drops of barley water were swallowed. His mouth was dry—his throat burning—his thirst excessive, and all that he attempted to swallow was rejected with horror.

At nine o'clock at night he was largely bled. His respiration was more free, but the dread of every fluid remained. After an hour's repose, he started and felt the most fearful pain in every limb—his whole body was agitated with violent convulsions. The former place of bleeding was re-opened and a great quantity of blood escaped. The pulse became small and accelerated. The countenance was dreadful—the eyes were starting from their sockets—he continually sprung from

his seat, and uttered the most fearful howling. A quantity of foam filled his mouth, and compelled a continual expectoration. In his violent fits the strength of six men was not sufficient to keep him on his bed. In the midst of a sudden access of fury he would disengage himself from all that were attempting to hold him, and dash himself on the floor; there, freed from all control, he rolled about, beat himself, and tore everything that he could reach. In the short intervals that separated these crises, he regained possession of his reasoning powers: he begged his old father to pardon him, he talked to him and to those around with the most intense affection, and it was only when he felt that a new attack was at hand, that he prayed them to leave him. At length his mental excitation began to subside; his strength was worn out, and he suffered himself to be placed on his bed. The horrible convulsions from time to time returned, but the dread of liquors had ceased. He demanded something to drink. They gave him a little white wine, but he was unable to swallow it; it was returned through his nostrils. The poor fellow then endeavoured to sleep; but it was soon perceived that he had ceased to live.

The early symptoms of rabies in the dog are occasionally very obscure. In the greater number of cases these are sullenness, fidgetiness, and continual shifting of posture. Where I have had opportunity, I have generally found these circumstances in regular succession. For several consecutive hours perhaps he retreats to his basket or his bed. He shows no disposition to bite, and he answers the call upon him laggardly. He is curled up and his face is buried between his paws and his breast. At length he begins to be fidgety. He searches out new resting-places; but he very soon changes them for others. He takes again to his own bed; but he is continually shifting his posture. He begins to gaze strangely about him as he lies on his bed. His countenance is clouded and suspicious. He comes to one and another of the family, and he fixes on them a steadfast gaze as if he would read their very thoughts. "I feel strangely ill," he seems to say: "have you anything to do with it? or you? or you?" Has not a dog mind enough for this? If we have observed a rabid dog at the commencement of the disease, we have seen this to the very life.

There is a species of dog—the small French poodle—the essence of whose character and constitution is fidgetiness or perpetual motion.

If this dog has been bitten, and rabies is about to establish itself, he is the most irritative restless being that can be conceived of; starting convulsively at the slightest sound; disposing of his bed in every direction; seeking out one retreat after another in order to rest his wearied frame, but quiet only for a moment in any one; and the

* La Folie des Animaux, by M. Perquin.

motion of his limbs frequently simulating chorea and even epilepsy.

A peculiar delirium is an early symptom, and one that will never deceive. A young man had been bitten by one of his dogs; I was requested to meet a medical gentleman on the subject. I was a little behind my time; as I entered the room I found the dog eagerly devouring a pan of sopped bread. "There is no madness here," said the gentleman. He had scarcely spoken, when in a moment the dog quitted the sop, and, with a furious bark, sprung against the wall as if he would seize some imaginary object that he fancied was there. "Did you see that?" was my reply. "What do you think of it?" "I see nothing in it," was his retort; "the dog heard some noise on the other side of the wall." At my serious urging, however, he consented to excise the part. I procured a poor worthless cur, and got him bitten by this dog, and carried the disease from this dog to a third victim: they all became rabid one after the other, and there my experiment ended. The serious matter under consideration, perhaps, justified me in going so far as I did.

This kind of delirium is of frequent occurrence in the human patient. The account given by Dr. Bardsley of one of his patients is very appropriate to our present purpose:—"I observed that he frequently fixed his eyes with horror and affright on some ideal object, and then, with a sudden and violent emotion, buried his head beneath the bed-clothes. The next time I saw him repeat this action, I was induced to inquire into the cause of his terror. He asked whether I had not heard howlings and scratchings. On being answered in the negative, he suddenly threw himself on his knees, extending his arms in a defensive posture, and forcibly threw back his head and body. The muscles of the face were agitated by various spasmodic contractions; his eye-balls glazed, and seemed ready to start from their sockets; and, at that moment, when crying out in an agonizing tone, 'Do you not see that black dog?' his countenance and attitude exhibited the most dreadful picture of complicated horror, distress, and rage, that words can describe or imagination paint."

I have again and again seen the rabid dog start up after a momentary quietude, with unmingled ferocity depicted on his countenance, and plunge with a savage howl to the end of his chain. At other times he would stop and watch the nails in the partition of the stable in which he was confined, and fancying them to move he would dart at them; and occasionally sadly bruise and injure himself from being no longer able to measure the distance of the object. In one of his sudden fits of violence a rabid dog strangled the Cardinal Crescence, the Legate of the Pope, at the Council of Trent, in 1532.

M. Magendie has often injected into the veins of an hydrophobous dog as much as five grains of opium without producing any effect; while a single grain given to a healthy dog would suffice to send him almost to sleep.

One of Mr. Babington's patients thought that there was a cloud of flies about him. "Why do you not kill those flies?" he would cry; and then he would strike at them with his hand, and shrink under the bed-clothes in the most dreadful fear.

There is also in the human being a peculiarity in this delirium which seems to distinguish it from every other kind of mental aberration. "The patient," in Mr. Lawrence's language, "is pursued by a thousand phantoms that intrude themselves upon his mind; he holds conversation with imaginary persons; he fancies himself surrounded with difficulties, and in the greatest distress. These thoughts seem to pass through his mind with wonderful rapidity, and to keep him in a state of the greatest distress, unless he is quickly spoken to or addressed by his name, and then, in a moment, the charm is broken; every phantom of imagination disappears, and at once he begins to talk as calmly and as connectedly as in perfect health."

So it is with the dog, whether he is watching the motes that are floating in the air, or the insects that are annoying him on the walls, or the foes that he fancies are threatening him on every side—one word recalls him in a moment. Dispersed by the magic influence of his master's voice, every object of terrors disappears, and he crawls towards him with the same peculiar expression of attachment that used to characterize him.

Then comes a moment's pause—a moment of actual vacuity—the eye slowly closes, the head droops, and he seems as if his fore feet were giving way, and he would fall: but he springs up again, every object of terror once more surrounds him—he gazes wildly around—he snaps—he barks, and he rushes to the extent of his chain, prepared to meet his imaginary foe.

The expression of the countenance of the dog undergoes a considerable change, principally dependent on the previous disposition of the animal. If he was naturally of an affectionate disposition, there will be an anxious, inquiring countenance, eloquent, beyond the power of resisting its influence. It is made up of strange suppositions as to the nature of the depression of mind under which he labours, mingled with some passing doubts, and they are but passing, as to the concern which the master has in the affair; but, most of all, there is an affectionate and confiding appeal for relief. At the same time we observe some strange fancy, evidently passing through his mind, unalloyed, however, by the slightest portion of ferocity.

In the countenance of the naturally savage brute, or him that has been trained to be savage,

there is indeed a fearful change; sometimes the conjunctiva is highly injected; at other times it is scarcely affected, but the eyes have an unusually bright and dazzling appearance. They are like two balls of fire, and there is a peculiar transparency of the hyaloid membrane, or injection of that of the retina.

A very early symptom of rabies in the dog, is an extreme degree of restlessness. Frequently, he is almost invariably wandering about, shifting from corner to corner, or continually rising up and lying down, changing his posture in every possible way, disposing of his bed with his paws, shaking it with his mouth, bringing it to a heap, on which he carefully lays his chest, or rather the pit of his stomach, and then rising up and bundling every portion of it out of the kennel. If he is put into a closed basket he will not be still for an instant, but turn round and round without ceasing. If he is at liberty, he will seem to imagine that something is lost, and he will eagerly search round the room, and particularly every corner of it, with strange violence and indecision.

In a very great portion of cases of hydrophobia in the human being, there is, as a precursory symptom, uneasiness, pain, or itching of the bitten part. A red line may also be traced up the limb, in the direction of the lymphatics. In a few cases the wound opens afresh.

The poison is now beginning fatally to act on the tissue, on which it had previously lain harmless. When the conversation has turned on this subject, long after the bitten part has been excised, pain has darted along the limb. I have been bitten much oftener than I liked, by dogs decidedly rabid, but, proper means being taken, I have escaped; and yet often, when I have been over-fatigued, or a little out of temper, some of the old sores have itched and throbbled, and actually become red and swollen.

The dog appears to suffer a great deal of pain in the ear in common canker. He will be almost incessantly scratching it, crying piteously while thus employed. The ear is, oftener than any other part, bitten by the rabid dog, and when a wound in the ear, inflicted by a rabid dog, begins to become painful, the agony appears to be of the intensest kind. The dog rubs his ear against every projecting body, he scratches it might and main, and tumbles over and over while he is thus employed.

The young practitioner should be on his guard there. Is this dreadful itching a thing of yesterday, or has the dog been subject to canker, increasing for a considerable period. Canker, both internal and external, is a disease of slow growth, and must have been long neglected before it will torment the patient in the manner that I have described. The question as to the length of time that an animal has thus suffered will usually be a sufficient guide.

The mode in which he expresses his torture will serve as another direction. He will often scratch violently enough when he has canker, but he will not roll over and over like a football except he is rabid. If there is very considerable inflammation of the lining membrane of the ear, and engorgement and ulceration of it, this is the effect of canker; but if there is only a slight redness of the membrane, or no redness at all, and yet the dog is incessantly and violently scratching himself, it is too likely that rabies is at hand.

In the early stage of rabies, the attachment of the dog towards his owner seems to be rapidly increased, and the expression of that feeling. He is employed, almost without ceasing, licking the hands, or face, or any part he can get at. Females, and men too, are occasionally apt to permit the dog, when in health, to indulge this filthy and very dangerous habit with regard to them. The virus, generated under the influence of rabies, is occasionally deposited on a wounded or abraded surface, and in process of time produces a similar disease in the person that has been so inoculated by it. Therefore it is that the surgeon so anxiously inquires of the person that has been bitten, and of all those to whom the dog has had access, "Has he been accustomed to lick you? have you any sore places about you that can by possibility have been licked by him?" If there are, the person is in fully as much danger as if he had been bitten, and it is quite as necessary to destroy the part with which the virus may have come in contact. A lady once lost her life by suffering her dog to lick a pimple on her chin.

There is a beautiful species of dog, often the inhabitant of the gentleman's stable—the Dalmatian, or coach-dog. He has, perhaps, less affection for the human species than any other dog, except the greyhound and the bull-dog; he has less sagacity than most others, and certainly less courage. He is attached to the stable; he is the friend of the horse; they live under the same roof; they share the same bed; and when the horse is summoned to his work, the dog accompanies every step. They are certainly beautiful dogs, and it is pleasing to see the thousand expressions of friendship between them and the horse; but, in their continual excursions through the streets, they are exposed to some danger, and particularly to that of being bitten by rabid dogs. It is a fearful business when this takes place. The coachman probably did not see the affray; no suspicion has been excited. The horse rubs his muzzle on the dog, and the dog licks the face of the horse, and in a great number of cases the disease is communicated from the one to the other. The dog in process of time dies, the horse does not long survive, and, frequently too, the coachman shares their fate. I have known at least twenty horses destroyed in this way.

A depraved appetite is a frequent attendant on rabies in the dog. He refuses his usual food; he frequently turns from it with an evident expression of disgust; at other times he seizes it with greater or less avidity, and then drops it, sometimes from disgust, at other times because he is unable to complete the mastication of it. This palsy of the organs of mastication, and dropping of the food, after it has been partly chewed, is a symptom on which implicit confidence may be placed.

Some dogs vomit once or twice in the early period of the disease: when this happens, they never return to the natural food of the dog, but are eager for everything that is filthy and horrible. The natural appetite generally fails entirely, and to it succeeds a strangely depraved one. The dog usually occupies himself with gathering every little bit of thread, and it is curious to observe with what eagerness and method he sets to work, and how completely he effects his object. He then attacks every kind of dirt and filth, horse-dung, his own dung, and human excrement. Some breeds of spaniels are very filthy feeders, without its being connected with disease, but the rabid dog eagerly selects the excrement of the horse, and his own. Some considerable care, however, must be exercised here. At the period of dentition, and likewise at the commencement of the sexual affection, the stomach of the dog, and particularly that of the bitch, sympathizes with, or shares in, the irritability of the gums, and of the constitution generally, and there is a considerably perverted appetite. The dog also feels the same propensity that influences the child, that of taking hard substances into the mouth, and seemingly trying to masticate them. Their pressure on the gums facilitates the passage of the new teeth. A young dog will, therefore, be observed gathering up hard substances, and, if he should chance to die, a not inconsiderable collection of them is sometimes found in the stomach. They are, however, of a peculiar character; they consist of small pieces of bone, stick, and coal.

The contents of the stomach of the rabid dog, are often, or generally, of a most filthy description. Some hair or straw is usually found, but the greater part is composed of horse-dung, or of his own dung, and it may be received as a certainty, that if he is found deliberately devouring it, he is rabid.

Some very important conclusions may be drawn from the appearance and character of the urine. The dog, and at particular times when he is more than usually salacious, may, and does diligently search the urining places; he may even, at those periods, be seen to lick the spot which another has just wetted; but, if a peculiar eagerness accompanies this strange employment, if, in the parlour, which is rarely disgraced by this

evacuation, every corner is perseveringly examined, and licked with unwearied and unceasing industry, that dog cannot be too carefully watched, there is great danger about him; he may, without any other symptom, be pronounced to be decidedly rabid. I never knew a single mistake about this.

Much has been said of the profuse discharge of saliva from the mouth of the rabid dog. It is an undoubted fact that, in this disease, all the glands concerned in the secretion of saliva, become increased in bulk and vascularity. The sublingual glands wear an evident character of inflammation; but it never equals the increased discharge that accompanies epilepsy, or nausea. The frothy spume at the corners of the mouth, is not for a moment to be compared with that which is evident enough in both of these affections. It is a symptom of short duration, and seldom lasts longer than twelve hours. The stories that are told of the mad dog covered with froth are altogether fabulous. The dog recovering from, or attacked by a fit, may be seen in this state, but not the rabid dog. Fits are often mistaken for rabies, and hence the delusion.

The increased secretion of saliva soon passes away. It lessens in quantity; it becomes thicker, viscid, adhesive, and glutinous. It clings to the corners of the mouth, and probably more annoyingly so to the membrane of the fauces. The human being is sadly distressed by it, he forces it out with the greatest violence, or utters the falsely supposed bark of a dog, in his attempts to force it from his mouth. This symptom occurs in the human being when the disease is fully established, or at a late period of it. The dog furiously attempts to detach it with his paws.

It is an early symptom in the dog, and it can scarcely be mistaken in him. When he is fighting with his paws at the corners of his mouth, let no one suppose that a bone is sticking between the poor fellow's teeth; nor should any useless and dangerous effort be made to relieve him. If all this uneasiness arose from a bone in the mouth, the mouth would continue permanently open instead of closing when the animal for a moment discontinues his efforts. If after a while he loses his balance and tumbles over, there can be no longer any mistake. It is the saliva becoming more and more glutinous, irritating the fauces, and threatening suffocation.

To this naturally and rapidly succeeds an insatiable thirst. The dog that still has full power over the muscles of his jaws continues to lap. He knows not when to cease, while the poor fellow labouring under the dumb madness, presently to be described, and whose jaw and tongue are paralyzed, plunges his muzzle into the water-dish to his very eyes, in order that he may get

one drop of water into the back part of his mouth to moisten and to cool his dry and parched fauces. Hence, instead of this disease being always characterized by the dread of water in the dog, it is marked by a thirst often perfectly unquenchable. Twenty years ago this assertion would have been peremptorily denied. Even at the present day we occasionally meet with those who ought to know better, and who will not believe that the dog which fairly, or perhaps eagerly, drinks, can be rabid.

January 22nd, 1815.—A Newfoundland dog belonging to a gentleman in Piccadilly was supposed to have swallowed a penny-piece, on the 20th. On the evening of that day he was dull, refused his food, and would not follow his master. 21st. He became restless and panting, and continually shifting his position. He would not eat, nor would he drink water, but followed his mistress into her bed-room, which he had never done before, and eagerly lapped the urine from the chamber-pot. He was afterwards seen lapping his own urine. His restlessness and panting increased. He would neither eat nor drink, and made two or three attempts to vomit. 22nd. He was brought to me this evening. His eyes were wild, the conjunctiva considerably inflamed, and he panted quickly and violently. There was a considerable flow of saliva from the corners of his mouth. He was extremely restless, and did not remain in one position half a minute. There was an occasional convulsive nodding motion of the head. The eyes were wandering, and evidently following some imaginary object; but he was quickly recalled from his delirium by my voice or that of his master. In a few moments, however, he was wandering again. He had previously been under my care, and immediately recognised me, and offered me his paw. His bark was changed, and had a slight mixture of the howl, and there was a husky choking noise in the throat.

I immediately declared that he was rabid, and with some reluctance on the part of his master, he was left with me. 23rd, 8 A.M. The breathing was less quick and laborious. The spasm of the head was no longer visible. The flow of saliva had stopped and there was less delirium. The jaw began to be dependent; the rattling, choking noise in his throat louder. He carried straw about in his mouth. He picked up some pieces of old leather that lay within his reach, and carefully concealed them under his bed. Two minutes afterwards he would take them out again, and look at them, and once more hide them. He frequently voided his urine in small quantities, but no longer lapped it. A little dog was lowered into the den, but he took no notice of it. 10 P.M. Every symptom of fever returned with increased violence. He panted very much, and did not remain in the

same posture two seconds. He was continually running to the end of his chain and attempting to bite. He was eagerly and wildly watching some imaginary object. His voice was hoarser—more of the howl mixing with it. The lips were distorted, and the tongue very black. He was evidently getting weaker. After two or three attempts to escape, he would sit down for a second, and then rise and plunge to the end of his chain. He drank frequently, yet but little at a time, and that without difficulty or spasm. 12 P.M. The thirst strangely increased. He had drunk or spilled full three quarts of water. There was a peculiar eagerness in his manner. He plunged his nose to the very bottom of his pan, and then snapped at the bubbles which he raised. No spasm followed the drinking. He took two or three pieces from my hand, but immediately dropped them from want of power to hold them. Yet he was able for a moment suddenly to close his jaws. When not drinking he was barking with a harsh sound, and frequently started suddenly, watching, and catching at some imaginary object. 24th, A.M. He was more furious, yet weaker. The thirst was insatiable. He was otherwise diligently employed in shattering and tearing everything within his reach. He died about three o'clock.

It was impossible to say what was the origin of this disease in him. It is not connected with any degree or variation of temperature, or any particular state of the atmosphere. It is certainly more frequent in the summer, or the beginning of autumn, than in the winter or spring, because it is a highly nervous and febrile disease, and the degree of fever, and irritability, and ferocity, and consequent mischief are augmented by increase of temperature. In the great majority of cases the inoculation can be distinctly proved. In very few can the possibility be denied. The injury is inflicted in an instant. There is no contest, and before the injured party can prepare to retaliate, the rabid dog is far away.

It can easily be believed that when a favourite dog has but for a moment lagged behind, he may be bitten without the owner's knowledge or suspicion. A spaniel belonging to a lady became rabid. The dog was her companion in her grounds at her country residence, and it was rarely out of her sight, except for a few minutes in the morning when the servant took it out. She was not conscious of its having been bitten, and the servant stoutly denied it. The animal died. A few weeks afterwards the footman was taken ill. He was hydrophobous. In one of his intervals of comparative quietude he confessed that one morning his charge had been attacked, and rolled over by another dog; that there was no appearance of its having been bitten, but that it had been made sadly dirty, and he had washed it before he suf-

ferred it again to go into the drawing-room. The dog that attacked it must have been rabid, and some of his saliva must have remained about the coat of the spaniel, by which the servant was fatally inoculated.

Another case of this fearful disease must not be passed over. A dog that had been docile and attached to his master and mistress, was missing one morning, and came home in the evening almost covered with dirt. He slunk to his basket, and would pay no attention to any one. His owners thought it rather strange, and I was sent for in the morning. He was lying on the lap of his mistress, but was frequently shifting his posture, and every now and then he started as if he heard some strange sound. I immediately told them what was the matter, and besought them to place him in another and secure room. He had been licking both their hands. I was compelled to tell them at once what was the nature of the case, and besought them to send at once for their surgeon. They were perfectly angry at my nonsense as they called it, and I took my leave, but went immediately to their medical man, and told him what was the real state of the case. He called as it were accidentally a little while afterwards, and I was not far behind him. The surgeon did his duty and they escaped.

In May, 1820, I attended on a bitch at Pimlico. She had snapped at the owner, bitten the man-servant and several dogs, was eagerly watching imaginary objects, and had the peculiar rabid howl. I offered her water. She started back with a strange expression of horror, and fell into violent convulsions that lasted about a minute. This was repeated a little while afterwards, and with the same result. She was destroyed.

The horrible spasms of the human being at the sight of, or the attempt to swallow, fluids occur sufficiently often to prove the identity of the disease in the biped and the quadruped; but not in one in fifty cases is there in the dog the slightest reluctance to liquids, or difficulty in swallowing them.

In almost every case in which the dog utters any sound during the disease, there is a manifest change of voice. In the dog labouring under ferocious madness it is perfectly characteristic. There is no other sound that it resembles. The animal is generally standing, or occasionally sitting, when the singular sound is heard. The muzzle is always elevated. The commencement is that of a perfect bark ending abruptly and very singularly, in a howl a fifth, sixth, or eighth higher than at the commencement. Dogs are often enough heard howling, but in this case it is the perfect bark and the perfect howl rapidly succeeding to the bark.

Every sound uttered by the rabid dog is more

or less changed. The huntsman who knows the voice of every dog in his pack, occasionally hears a strange challenge. He immediately finds out that dog, and puts him as quickly as possible under confinement. Two or three days may pass over, and there is not another suspicious circumstance about the animal; still he keeps him under quarantine, for long experience has taught him to listen to that warning. At length the disease is manifest in its most fearful form.

There is another partial change of voice to which the ear of the practitioner will by degrees become habituated, and which will indicate a change in the state of the animal quite as dangerous as the dismal howl; I mean when there is a hoarse inward bark with a slight but characteristic elevation of the tone. In other cases, after two or three distinct barks will come the peculiar one mingled with the howl. Both of them will terminate fatally, and in both of them the rabid howl cannot possibly be mistaken.

There is a singular brightness in the eye of the rabid dog, but it does not last more than two or three days. It then becomes dull and wasted; a cloudiness steals over the conjunctiva, which changes to a yellow tinge, and then to a dark green, indicative of ulceration deeply seated within the eye. In eight-and-forty hours from the first clouding of the eye, it becomes one disorganized mass.

There is in the rabid dog a strange embarrassment of general sensibility—a seemingly total loss of feeling.

Absence of pain in the bitten part is an almost invariable accompaniment of rabies. I have known a dog set to work, and gnaw and tear the flesh completely away from his legs and feet. At other times the penis is perfectly demolished from the very base. Ellis, in his "Shepherd's Sure Guide," asserts that however severely a mad dog is beaten a cry is never forced from him. I am certain of the truth of this, for I have again and again failed in extracting that cry. Ellis tells that at the kennel at Goddesden, some of the grooms heated a poker red hot, and holding it near the mad hound's mouth, he most greedily seized it, and kept it until the mouth was most dreadfully burned.

In the great majority of cases of furious madness, and in almost every case of dumb madness, there is evident affection of the lumbar portion of the spinal cord. There is a staggering gait, not indicative of general weakness, but referable to the hind quarters alone, and indicating an affection of the lumbar motor nerve. In a few cases it approaches more to a general paralytic affection.

In the very earliest period of rabies, the person accustomed to dogs will detect the existence of the disease.

The animal follows the flight, as has been

already stated, of various imaginary objects. I have often watched the changing countenance of the rabid dog when he has been lost to every surrounding object. I have seen the brightening countenance and the wagging tail as some pleasing vision has passed before him; but oftener has the countenance indicated the mingled dislike and fear with which the intruder was regarded. As soon as the phantom came within the proper distance he darted on it with true rabid violence.

A spaniel, seemingly at play, snapped, in the morning, at the feet of several persons. In the evening he bit his master, his master's friend, and another dog. The old habits of obedience and affection then returned. His master, most strangely, did not suspect the truth, and brought the animal to me to be examined. The animal was, as I had often seen him, perfectly docile and eager to be caressed. At my suggestion, or rather entreaty, he was left with me. On the following morning the disease was plain enough, and on the following day he died. A *post-mortem* examination took place, and proved that he was unequivocally rabid.

A lady would nurse her dog, after I had declared it to be rabid, and when he was dangerous to every one but herself, and even to her from the saliva which he plentifully scattered about. At length he darted at every one that entered the room, until a footman keeping the animal at bay with the poker, the husband of the lady dragged her from the room. The noise that the dog made was then terrific, and he almost gnawed his way through the door. At midnight his violence nearly ceased, and the door was partially opened. He was staggering and falling about, with every limb violently agitated. At the entreaty of the lady, a servant ventured in to make a kind of bed for him. The dog suddenly darted at him, and dropped and died.

A terrier, ten years old, had been ill, and refused all food for three days. On the fourth day he bit a cat of which he had been unusually fond, and he likewise bit three dogs. I was requested to see him. I found him loose in the kitchen, and at first refused to go in, but, after observing him for a minute or two, I thought that I might venture. He had a peculiarly wild and eager look, and turned sharply round at the least noise. He often watched the flight of some imaginary object, and pursued with the utmost fury every fly that he saw. He searchingly sniffed about the room, and examined my legs with an eagerness that made me absolutely tremble. His quarrel with the cat had been made up, and when he was not otherwise employed he was eagerly licking her and her kittens. In the excess or derangement of his fondness, he fairly rolled them from one end of the kitchen to another. With

difficulty I induced his master to permit me to destroy him.

It is not every dog, that in the most aggravated state of the disease shows a disposition to bite. The finest Newfoundland dog that I ever saw became rabid. He had been bitten by a cur, and was supposed to have been thoroughly examined in the country. No wound, however, was found: the circumstance was almost forgotten, and he came up to the metropolis with his master. He became dull, disinclined to play, and refused all food. He was continually watching imaginary objects, but he did not snap at them. There was no howl, nor any disposition to bite. He offered himself to be caressed, and he was not satisfied except he was shaken by the paw. On the second day I saw him. He watched every passing object with peculiar anxiety, and followed with deep attention the motions of a horse, his old acquaintance; but he made no effort to escape, nor evinced any disposition to do mischief. I went to him, and patted and coaxed him, and he told me, as plainly as looks and actions, and a somewhat deepened whine could express it, how much he was gratified. I saw him on the third day. He was evidently dying. He could not crawl even to the door of his temporary kennel; but he pushed forward his paw a little way, and, as I shook it, I felt the tetanic muscular action which accompanies the departure of life.

On the other hand there are rabid dogs whose ferocity knows no bounds. If they are threatened with a stick, they fly at, and seize it, and furiously shake it. They are incessantly employed in darting to the end of their chain, and attempting to crush it with their teeth, and tearing to pieces their kennel, or the wood work that is within their reach. They are regardless of pain. The canine teeth, the incisor teeth are torn away; yet, unwearied and insensible to suffering, they continue their efforts to escape. A dog was chained near a kitchen fire. He was incessant in his endeavours to escape, and, when he found that he could not effect it, he seized, in his impotent rage, the burning coals as they fell, and crushed them with his teeth.

If by chance a dog in this state effects his escape, he wanders over the country bent on destruction. He attacks both the quadruped and the biped. He seeks the village street or the more crowded one of the town, and he suffers no dog to escape him. The horse is his frequent prey, and the human being is not always safe from his attack. A rabid dog running down Park Lane, in 1825, bit no fewer than five horses, and fully as many dogs. He was seen to steal treacherously upon some of his victims, and inflict the fatal wound. Sometimes he seeks the more distant pasturage. He gets among the sheep, and more

than forty have been fatally inoculated in one night. A rabid dog attacked a herd of cows, and five-and-twenty of them fell victims. In July, 1813, a mad dog broke into the menagerie of the Duchess of York, at Oatlands, and although the palisades that divided the different compartments of the menagerie were full six feet in height, and difficult, or apparently almost impossible to climb, he was found asleep in one of them, and it was clearly ascertained that he had bitten at least ten of the dogs.

At length the rabid dog becomes completely exhausted, and slowly reels along the road with his tail depressed, seemingly half unconscious of surrounding objects. His open mouth, and protruded and blackened tongue, and rolling gait, sufficiently characterize him. He creeps into some sheltered place, and then he sleeps twelve hours or more. It is dangerous to disturb his slumbers, for his desire to do mischief immediately returns, and the slightest touch, or attempt to caress him, is repaid by a fatal wound. This should be a caution never to meddle with a sleeping dog in a wayside house, and, indeed, never to disturb him anywhere.

In an early period of the disease in some dogs, and in others when the strength of the animal is nearly worn away, a peculiar paralysis of the muscles of the tongue and jaws is seen. The mouth is partially open, and the tongue protruding. In some cases the dog is able to close his mouth by a sudden and violent effort, and is as ferocious and as dangerous as one the muscles of whose face are unaffected. At other times the palsy is complete, and the animal is unable to close his mouth, or retract his tongue. These latter cases, however, are rare.

A dog must not be immediately condemned because he has this open mouth and fixed jaw. Bones constitute a frequent and a considerable portion of the food of dogs. In the eagerness with which these bones are crushed, spicula or large pieces of them become wedged between the molar teeth, and form an insuperable obstacle to the closing of the teeth. The tongue partially protrudes. There is a constant discharge of saliva from the mouth, far greater than when the true paralysis exists. The dog is continually fighting at the corners of his mouth, and the countenance is expressive of intense anxiety, although not of the same irritable character as in rabies.

I was once requested to meet a medical gentleman in consultation respecting a supposed case of rabies. There was protrusion and discoloration of the tongue, and fighting at the corners of the mouth, and intense anxiety of countenance. He had been in this state for four-and-twenty hours. This was a case in which I should possibly have been deceived had it been the first dog that I had

seen with dumb madness. After having tested a little the ferocity or manageableness of the animal, I passed my hand along the outside of the jaws, and felt a bone wedged between two of the grinders. The forceps soon set all right with him.

It is time to inquire more strictly into the *post-mortem* appearances of rabies in the dog.

In dumb madness the unfailing accompaniment is, to a greater or less degree, paralysis of the muscles of the lower jaw, and the tongue is discoloured and swollen, and hanging from the mouth; more blood than usual also is deposited in the anterior and inferior portion of it. Its colour varies from a dark red to a dingy purple, or almost black. In ferocious madness it is usually torn and bruised, or it is discoloured by the dirt and filth with which it has been brought into contact, and, not unfrequently, its anterior portion is coated with some disgusting matter. The papillæ, or small projections on the back of the tongue, are elongated and widened, and their mucous covering evidently reddened. The orifices of the glands of the tongue are frequently enlarged, particularly as they run their course along the frænum of the tongue.

The fauces, situated at the posterior part of the mouth, generally exhibit traces of inflammation. They appear in the majority of cases of ferocious madness, and they are never deficient after dumb madness. They are usually most intense either towards the palatine arch or the larynx. Sometimes an inflammatory character is diffused through its whole extent, but occasionally it is more or less intense towards one or both of the terminations of the fauces, while the intermediate portion retains nearly its healthy hue.

There is one circumstance of not unfrequent occurrence, which will at once decide the case—the presence of indigestible matter, probably small in quantity, in the back part of the mouth. This speaks volumes as to the depraved appetite of the patient, and the loss of power in the muscles of the pharynx.

Little will depend on the tonsils of the throat. They occasionally enlarge to more than double their usual size; but this is more in quiet than in ferocious madness. The insatiable thirst of the rabid dog is perhaps connected with this condition of them.

The epiglottis should be very carefully observed. It is more or less injected in every case of rabies. Numerous vessels increase in size and multiply round its edge, and there is considerable injection and thickening.

Inflammation of the edges of the glottis, and particularly of the membrane which covers its margin, is often seen, and accounts for the harsh guttural breathing which frequently accompanies

dumb madness. The inflammatory blush of the larynx, though often existing in a very slight degree, deserves considerable attention.

The appearances in the trachea are very uncertain. There is occasionally the greatest intensity of inflammation through the whole of it; at other times there is not the slightest appearance of it. There is the same uncertainty with regard to the bronchial tubes and the lungs; but there is no characteristic symptom or lesion in the lungs.

Great stress has been laid on the appearance of the heart; but generally speaking, in nine cases out of ten, the heart of the rabid dog will exhibit no other symptoms of disease than an increased yet variable deepness of colour in the lining membrane of the ventricles.

No dependence can be placed on any of the appearances of the œsophagus; and, when they are at the worst, the inflammation occupies only a portion of that tube.

With regard to the interior of the stomach, if the dog has been dead only a few hours the true inflammatory blush will remain. If four-and-twenty hours have elapsed, the bright red colour will have changed to a darker red, or a violet or a brownish hue. In a few hours after this, a process of corrosion will generally commence, and the mucous membrane will be softened and rendered thinner, and, to a certain extent, eaten through. The examiner, however, must not attribute that to disease which is the natural process of the cessation of life.

Much attention should be paid to the appearance of the stomach and its contents. If it contains a strange mingled mass of hair, and hay, and straw, and horse-dung, and earth, or portions of the bed on which the dog had lain, we should seldom err if we affirmed that he died rabid; for it is only under the influence of the depraved appetite of rabies that such substances are devoured. It is not the presence of every kind of extraneous substance that will be satisfactory: pieces of coal, or wood, or even the filthiest matter, will not justify us in pronouncing the animal to be rabid; it is that peculiarly mingled mass of straw, and hair, and filth of various kinds, that must indicate the existence of rabies.

When there are no solid indigesta, but a fluid composed principally of vitiated bile or extravasated blood, there will be a strong indication of the presence of rabies. When, also, there are in the duodenum and jejunum small portions of indigesta, the detection of the least quantity will be decisive. The remainder has been ejected by vomit; and inquiry should be made of the nature of the matter that has been discharged.

The inflammation of rabies is of a peculiar character in the stomach. It is generally confined to the summits of the folds of the stomach, or it

is most intense there. On the summits of the rugæ there are effusions of bloody matter, or spots of ecchymosis, presenting an appearance almost like crushed black currants. There may be only a few of them; but they are indications of the evil that has been effected.

From appearances that present themselves in the intestines, the bladder, the blood-vessels, or the brain, no conclusion can be drawn; they are simply indications of inflammation.

We now rapidly, and for a little while, retrace our steps. What is the cause of this fatal disease, that has so long occupied our attention? It is the saliva of a rabid animal received into a wound, or on an abraded surface. In horses, cattle, sheep, swine, and the human being, it is caused by inoculation alone; but, according to some persons, it is produced spontaneously in other animals.

I will suppose that a wound by a rabid dog is inflicted. The virus is deposited on or near its surface, and there it remains for a certain indefinite period of time. The wound generally heals up kindly; in fact, it differs in no respect from a similar wound inflicted by the teeth of an animal in perfect health. Weeks and months in some cases pass on, and there is nothing to indicate danger, until a degree of itching in the cicatrix of the wound is felt. From its long-continued presence as a foreign body, it may have rendered the tissue, or nervous fibre connected with it, irritable and susceptible of impression, or it may have attracted and assimilated to itself certain elements, and rabies is produced.

The virus does not appear to have the same effect on every animal. Of four dogs bitten by, or inoculated from, one that is rabid, three, perhaps, would display every symptom of the disease. Of four human beings, not more than one would become rabid. John Hunter used to say not more than one in twenty; but that is probably erroneous. Cattle appear to have a greater chance of escape, and sheep a still greater chance.

The time of incubation is different in different animals. With regard to the human being, there are various strange and contradictory stories. Some have asserted that it has appeared on the very day on which the bite was inflicted, or within two or three days of that time. Dr. Bardsley, on the other hand, relates a case in which twelve years elapsed between the bite and the disease. If the virus may lurk so long as this in the constitution, it is a most lamentable affair. According to one account more than thirty years intervened. The usual time extends from three weeks to six or seven months.

In the dog I have never seen a case in which plain and palpable rabies occurred in less than fourteen days after the bite. The average time I should calculate at five or six weeks. In three

months I should consider the animal as tolerably safe. I am, however, relating my own experience, and have known but two instances in which the period much exceeded three months. In one of these five months elapsed, and the other did not become affected until after the expiration of the seventh month.

The quality and the quantity of the virus may have something to do with this, and so may the predisposition in the bitten animal to be affected by the poison. If it is connected with œstrum, the bitch will probably become a disgusting, as well as dangerous animal; if with parturition, there is a strange perversion of maternal affection—she is incessantly and violently licking her young, continually shifting them from place to place; and, in less than four-and-twenty hours, they will be destroyed by the reckless manner in which they are treated. In both cases the development of the disease seems to wait on the completion of her time of pregnancy. It appears in the space of two months after the bite, if her parturition is near at hand, or it is delayed for double that time, if the period of labour is so far distant.

The duration of the disease is different in different animals. In man it has run its course in twenty-four hours, and rarely exceeds seventy-two. In the horse from three to four days; in the sheep and ox from five to seven; and in the dog from four to six.

Of the real nature of the rabid virus we know but little. It has never been analyzed, and it would be a difficult process to analyze it. It is not diffused by the air, nor communicated by the breath, nor even by actual contact, if the skin is sound. It must be received into a wound. It must come in contact with some tissue or nervous fibre, and lie dormant there for a considerable, but uncertain period. The absorbents remove everything around; whatever else is useless, or would be injurious, is taken away, but this strange substance is unchanged. It does not enter into the circulation, for there it would undergo some modification and change, or would be rejected. It lies for a time absolutely dormant, and far longer than any other known poison; but, at length, the tissue on which it has lain begins to render it somewhat sensible, and assimilates to itself certain elements. The cicatrix begins to be painful, and inflammation spreads around. The absorbents are called into more powerful action; they begin to attack the virus itself, and a portion of it is taken up, and carried into the circulation, and acquires the property of assimilating other secretions to its own nature, or it is determined to one of the secretions only; it alters the character of that secretion, envenoms it, and gives it the power of propagating the disease.

Something like this is the history of many

animal poisons. In variola and the vaccine disease the poison is determined to the skin, in glanders to the Schneiderian membrane, and in farcy to the superficial absorbents. Each in its turn becomes the depôt of the poison. So it is with the salivary glands of the rabid animal; in them it is formed, or to them it is determined, and from them, and them alone, is it communicated to other animals.

Professor Dick, in his valuable *Manual of Veterinary Science*, states some peculiar views, and those highly interesting, respecting the disease of rabies. He holds it to be essentially an inflammatory affection, attacking peculiarly the mucous membrane of the nose, and extending thence through the cribriform plate of the ethmoid bones to the interior part of the brain, and so giving rise to a derangement of the nervous system as a necessary consequence. This train of symptoms constitutes mainly, if not wholly, the essence of an occasional epidemic not unlike some forms of influenza or epizootic disease, and the bite of a rabid animal is not always, to an animal so bitten, the exciting cause of the disease, but merely an accidental concomitant in the prevailing disorder. Also the disease hydrophobia, produced in man, is not always the result of any poison introduced into his system, but merely the melancholy, and often fatal result of panic fear, and of the disordered state of the imagination. Those who are acquainted with the effects of sympathy, and imitation, and panic, in the production of nervous disorders, will readily apprehend the meaning of the Professor.

Some of these diseases speedily run their course and exhaust themselves. Cowpox and farcy, in many instances, have this character. Perhaps, to a certain degree, this may be affirmed of all of them. I have seen cases which I could not mistake, in which the symptoms of rabies were one after another developed. The dog was plainly and undeniably rabid, and I had given him up as lost; but, after a certain period, the symptoms began to be less distinct; they gradually disappeared, and the animal returned to perfect health. This may have formed one ground of belief in the power of certain medicines, and most assuredly it gives encouragement to perseverance in the use of remedial measures.

It has then been proved, and I hope demonstratively, that rabies is propagated by inoculation. It has also been established that although every animal labouring under this disease is capable of communicating it, yet, with very few exceptions, it can be traced to the bite of the dog. It has still further been shown that the malady generally appears at some period between the third and seventh month from the time of inoculation. At the expiration of the eighth month, the animal may be considered to be safe; for there is only one acknowledged case on record in which the disease

appeared in the dog after the seventh month from the bite had passed.

Then it would appear that if a species of quarantine could be established, and every dog confined separately for eight months, the disease would be annihilated in our country, or could only reappear in consequence of the importation of some infected animal. Such a course of proceeding, however, could never be enforced, either in the sporting world, or among the peasantry. Other measures, however, might be resorted to in order to lessen the devastations of this malady; and that which first presents itself to the mind as a powerful cause of rabies is the number of useless and dangerous dogs that are kept in the country for the most nefarious and, in the neighbourhood of considerable towns, the most brutal purposes; without the slightest hesitation, I will affirm that rabies is propagated nineteen times out of twenty, by the cur and the lurcher in the country, and the fighting-dog in towns.

A tax should be laid on every useless dog, and doubly or trebly heavier than on the sporting dog. No dog except the shepherd's should be exempt from this tax, unless, perhaps, it is the truck-dog, and his owner should be compelled to take out a license; to have his name in large letters on his cart; and he should be heavily fined if the animal is found loose in the streets, or if he is used for fighting.

The disease is rarely propagated by petted and house-dogs. They are little exposed to the danger of inoculation; yet, we pity, or almost detest, the folly of those by whom their favourites are indulged and spoiled even more than their children.

We will now suppose that a person has had the misfortune to be bitten by a rabid dog: what course is he to pursue? What preventive means are to be adopted? Some persons, and of no mean standing in the medical world, have recommended a ligature. The reply would be, that this ligature must be worn during a very inconvenient and dangerous period of time. The virus lies in the wound inert during many successive weeks and months.

Dr. Haygarth first suggested that a long continued stream of warm water should be poured upon the wound from the mouth of a kettle. He says that the poison exists in a fluid form, and therefore we should suppose that water would be its natural solvent. Dr. Massey adds to this, that if the wound is small, it should be dilated, in order that the stream may descend on the part on which the poison is deposited. We are far, however, from being certain that this falling of water on the part, may not by possibility force a portion of the virus farther into the texture, or cause it to be entangled with other parts of the wound.*

* The physician Apollonius, having been bitten by a rabid dog, induced another dog to lick the wound, "*ut idem medicus esset qui vulneris auctor fuit.*"

There is a similar or stronger objection to the cupping-glass of Dr. Barry. The virus, forced from the texture with which it lies in contact by the rush of blood from the substance beneath, is too likely to inoculate, or become entangled with, other parts of the wound.

There is great objection to suction of the wound; for, in addition to this possible entanglement, the lips, or the mouth, may have been abraded, and thus the danger considerably aggravated. There also remains the undecided question as to the absorption of the virus through the medium of the mucous surface.

Excision of the part is the mode of prevention usually adopted by the human surgeon, and to a certain extent it is a judicious practice. If the virus is not received into the circulation, but lies dormant in the wound for a considerable time, the disease cannot supervene if the inoculated part is destroyed.

This operation, however, demands greater skill and tact than is generally supposed. It requires a determination fully to accomplish the desired object; for every portion of the wound with which the tooth could possibly have come in contact, must be removed. This is often exceedingly difficult to accomplish on account of the situation and direction of the wound. The knife must not enter the wound, or it will be likely to be itself empoisoned, and then the mischief and the danger will be increased instead of removed. Dr. Massey was convinced of the impropriety of this when he advised that, "should the knife by chance enter the wound that had been made by the dog's tooth, the operation should be recommenced with a clean knife, otherwise the sound parts will become inoculated."

If the incision is made freely and properly round the wound, and does not penetrate into it, yet the blood will follow the knife, and a portion of it will enter into the wound caused by the dog, and will come in contact with the virus, and will probably be contaminated, and will then overflow the original wound, and will be received into the new incision, and will carry with it the seeds of disease and death: therefore it is, that scarcely a year passes without some lamentable instances of the failure of incisions. It has occurred in the practice of the most eminent surgeons, and seems scarcely or not at all to impeach the skill of the operator.

Aware of this, there are very few human practitioners who do not use the caustic after the knife. Every portion of the new wound is submitted to its influence. They do not consider the patient to be safe without this second operation. But has the question never occurred to them, that if the caustic is necessary to give security to the operation by incision, the knife might have been spared, and the caustic alone used?

The veterinary surgeon, when operating on the horse, or cattle, or the dog, frequently has recourse to the actual cautery. I could, perhaps, excuse this practice, although I would not adopt it, in superficial wounds; but I do not know the instrument that could be safely used in deeper ones. If it were sufficiently small to adapt itself to the tortuous course of little wounds, it would be cooled and inert before it could have destroyed the lower portions of them. If it were of sufficient substance long to retain the heat, it would make a large and fearful chasm, and probably interfere with the future usefulness of the animal. The result of the cases in which the cautery has been used proves that in too many instances it is an inefficient protection. The rabid dog in Park Lane has already been mentioned. He bit several horses before he could be destroyed. Caustic was applied to one of them, and the hot iron to the others. The first was saved, almost all the others were lost. A similar case occurred last spring; the caustic was an efficacious preventive; the cautery was perfectly useless. What caustic then should be applied? Certainly not that to which the surgeon usually has recourse—a liquid one. Certainly not one that speedily deliquesces; for they are both unmanageable, and, what is a more important consideration, they may hold in solution, and not decompose the poison, and thus inoculate the whole of the wound. The application which promises to be successful, is that of the *lunar caustic*. It is perfectly manageable, and, being sharpened to a point, may be applied with certainty to every recess and sinuosity of the wound.

Potash and nitric acid form a caustic which will destroy the substances with which they come in contact, but the combination of this caustic and the animal fibre will be a soft or semi-fluid mass. In this the virus is suspended, and with this it lies or may be precipitated upon the living fibre beneath. Then there is danger of re-inoculation; and it would seem that this fatal process is often accomplished. The eschar formed by the lunar caustic is dry, hard, and insoluble. If the whole of the wound has been fairly exposed to its action, an insoluble compound of animal fibre and the metallic salt is produced, in which the virus is wrapped up, and from which it cannot be separated. In a short time the dead matter sloughs away, and the virus is thrown off with it.

Previous to applying the caustic it will sometimes be necessary to enlarge the wound, in order that every part may be fairly got at; and the eschar having sloughed off, it will always be prudent to apply the caustic a second time, but more slightly, in order to destroy any part that may not have received the full influence of the first operation, or that, by possibility, might have been inoculated during the operation.

Mr. Smerdon, in the *Medical and Physical Journal*, March 1820, thus reasons:—"All the morbid poisons that require to lie dormant a certain time before their effects are manifested, pass into the system through the medium of the absorbents" (we somewhat differ from Mr. Smerdon here, but his reasoning is equally applicable to the nervous system), "and if the absorbents are excited, their action is increased. I am satisfied that even in a venereal sore the application of a caustic, instead of destroying the disease, causes its rapid extension. Then," asks he, "if the virus on a small venereal sore is rendered more active by the caustic, is it not highly probable that the same law holds good with respect to the poison of rabies?"

The sooner the caustic is applied the better; but I should not hesitate to have recourse to it even after the constitution has become affected. It is related in the *Medico-Chirurgical Annals of Altenburgh* (Sept. 1821), that two men were bitten by a rabid dog. One became hydrophobic and died; the other had evident symptoms of hydrophobia a few days afterwards. A surgeon excised the bitten part, and the disease disappeared. After a period of six days the symptoms returned. The wound was examined; considerable fungus was found sprouting from its bottom. This was extirpated. The hydrophobic symptoms were again removed, and the man did well. This is a most instructive case.

In the *Journal Pratique de Médecine Vétérinaire*, M. Damalix gives an interesting account of the effect of a bite of a rabid dog on a horse. On the 8th of July, 1828, a fowl-merchant, proceeding to the market of Colmar, was attacked by a dog, who, after some fruitless efforts to get into the cart, bit the horse on the left side of the face, and fled precipitately. A veterinary surgeon was sent for, who applied the cautery to the horse, gave him some populeum ointment and bled him. Everything appeared to go on well, and on the 16th the wounds were healed.

On the 25th a great alteration took place. The horse was careless and slow; he sometimes refused to go at all, and would not attend in the least to the whip, which had never occurred before. In the evening the wounds opened spontaneously, an ichorous and infectious pus run from them; there was salivation and utter loss of appetite: strange fancies seem to possess him; he showed a desire to bite his master. The veterinary surgeon might approach him with safety; but the moment his owner or the children appeared, he darted at them, and would have torn them in pieces. The disease now took on the appearance of acute glanders; livid and fungous wounds broke out; the stable was saturated with an infectious smell, the horse refused his food, or was unable to eat. The mayor at last interfered, and the animal was

See account of Mr. Varley's
Experiments - by inoculation
of pure Hydrophobia - Dachs

destroyed. In the Treatises on The Horse, Cattle, and Sheep, accounts are fully given of this dreadful malady in these animals. It may not be uninteresting to give a hasty sketch of it in some of the inferior classes.

Rabies in the Rabbit.—I very much regret that I never instituted a course of experiments on the production and treatment of rabies in this animal. It would have been attended with little expense or danger, and some important discoveries might have been made. Mr. Earle, in a case in which he was much interested, inoculated two rabbits with the saliva of a dog that had died rabid. They were punctured at the root of the ears. One of the rabbits speedily became inflamed about the ears, and the ears were paralyzed in both rabbits. The head swelled very much, and extensive inflammation took place around the part where the virus was inserted. One of them died without exhibiting any of the usual symptoms of the disease; the other, after a long convalescence, survived, and eventually recovered the use of his ears. Mr. Earle very properly doubted whether this was a case of rabies.

Dr. Capello describes, but not in so satisfactory a manner as could be wished, a case of supposed rabies in one of these animals. A rabbit and a dog lived together in a family. They were strange associates; but such friendships are not unfrequent among animals. The dog became rabid, and died. A man bitten by that dog became hydrophobous, and died. No one dreamed of the rabbit being in danger, and he ran about the house as usual; but, one day, he found his way to the chamber of the mistress of the house, with a great deal of viscid saliva running from his mouth, furiously attacked her, and left the marks of his violence on her leg. He then ran into a neighbouring stable, and bit the hind legs of a horse several times. Finally, he retreated to a corner of the stable, and was there found dead. Neither the lady nor the horse eventually suffered.

Rabies in the Guinea-pig.—A man suspected of being hydrophobous was taken to the Middlesex Hospital. He was examined before several of the medical students; one of whom, in order to make more sure of the affair, inoculated a guinea-pig with the saliva taken from the man's mouth. The guinea-pig had been usually very playful, and fond of being noticed; but, on the eleventh day after this inoculation, he began to be dull and sullen, retiring into his house, and hiding himself as much as he could in a corner. On the following day he became out of temper, and even ferocious in his way; he bit at everything that was presented to him, gnawed his cage, and made the most determined efforts to escape. Once or twice his violence induced convulsions of his whole frame;

and they might be produced at pleasure by dashing a little water at him. In the course of the night following he died.

Rabies in the Cat.—Fortunately for us, this does not often occur; for a mad cat is a truly ferocious animal. I have seen two cases, one of them to my cost; yet I am unable to give any satisfactory account of the progress of the disease. The first stage seems to be one of sullenness, and which would probably last to death; but from that sullenness it is dangerous to rouse the animal. It probably would not, except in the paroxysm of rage, attack any one; but during that paroxysm it knows no fear, nor has its ferocity any bounds.

A cat, that had been the inhabitant of a nursery, and the playmate of the children, had all at once become sullen and ill-tempered. It had taken refuge in an upper room, and could not be coaxed from the corner in which it had crouched.

It was nearly dark when I went. I saw the horrible glare of her eyes, but I could not see so much of her as I wished, and I said that I would call again in the morning.

I found the patient, on the following day, precisely in the same situation, and the same attitude, crouched up in a corner, and ready to spring. I was very much interested in the case; and as I wanted to study the countenance of this demon, for she looked like one, I was foolishly, inexcusably imprudent. I went on my hands and knees, and brought my face nearly on a level with hers, and gazed on those glaring eyes, and that horrible countenance, until I seemed to feel the deathly influence of a spell stealing over me. I was not afraid, but every mental and bodily power was in a manner suspended. My countenance, perhaps, alarmed her, for she sprang on me, fastened herself on my face, and bit through both my lips. She then darted down stairs, and, I believe, was never seen again. I always have nitrate of silver in my pocket, even now I am never without it; I washed myself, and applied the caustic with some severity to the wound; and my medical adviser and valued friend, Mr. Millington, punished me still more after I got home. My object was attained, although at somewhat too much cost, for the expression of that brute's countenance will never be forgotten.

The later symptoms of rabies in this animal, no one, perhaps, has had the opportunity of observing: we witness only the sullenness and the ferocity.

Rabies in the Fowl.—Dr. Ashburner and Mr. King inoculated a hen with the saliva from a rabid cow. They made two incisions through the integument, under the wings, and then well rubbed into these cuts the foam taken from the cow's mouth. She was after this let loose among other fowls in the poultry-yard. The incisions soon

healed, and their places could with difficulty be discovered. Ten weeks passed over, when she was observed to refuse her food, and to run at the other fowls. She had a strange, wild appearance, and her eyes were bloodshot. Early on the following morning her legs became contracted, so that she very soon lost the power of standing upright. She remained sitting a long time, with the legs rigid, refusing food and water, and appearing very irritable when touched. She died in the evening, immediately after drinking a large quantity of water which had been offered to her.

Rabies in the Badger.—Hufeland, in his valuable *Journal of Practical Medicine*, relates a case of a rabid female badger attacking two boys. She bit them both, but she fastened on the thigh of one of them, and was destroyed in the act of sucking his blood. The poor fellow died hydrophobous, but the other escaped. This fact, certainly, gives us no idea of the general character of the disease in this animal; but it speaks volumes as to its ferocity.

Rabies in the Wolf.—Rabies is ushered in by nearly the same symptoms, and pursues the same course in the wolf as in the dog, with this difference, which would be readily expected, that his ferocity and the mischief which he accomplishes are much greater. The dog hunts out his own species, and his fury is principally directed against them; although, if he meets with a flock of sheep, or a herd of cattle, he readily attacks them, and, perhaps, bites the greater part of them. The dog, however, frequently turns out of his way to avoid the human being, and seldom attacks him without provocation. The wolf, on the contrary, although he commits fearful ravages among the sheep and cattle, searches out the human being as his favourite prey. He conceals himself near the entrance to the village, and steals upon and wounds every passenger that he can get at. There are several accounts of more than twenty persons having been bitten by one wolf; and there is a fearful history of sixteen persons perishing from the bite of one of these animals. This is in perfect agreement with the account which I have given of the connexion between the previous temper and habits of the rabid dog, and the mischief that he effects under the influence of this malady. The wolf, as he wanders in the forest, regards the human being as his persecutor and foe; and, in the paroxysm of rabid fury, he is most eager to avenge himself on his natural enemy. Strange stories are told of the arts to which he has recourse in order to accomplish his purpose. In the great majority of cases he steals unawares upon his victim, and the mischief is effected before the wood-cutter or the villager is conscious of his danger.

The following observations and experiments respecting rabies, by Dr. Hertwich, Professor at

the Veterinary School at Berlin, are well worthy of attention:—

1. Out of fifty dogs that had been inoculated with virus taken from a rabid animal of the same species, fourteen only were infected.

2. In the cases where inoculation had been practised without effect, no reason could be assigned why the disease should not have taken place. This consequently proves that the malady is similar to others of a contagious nature, and that there must exist a predisposition in the individual to receive the disease before it can occur. In one experiment, a mastiff dog, aged four years, was inoculated without exhibiting any symptoms of the malady, while seven others, who had been inoculated at the same time and place, soon became rabid. Several of these animals had been inoculated several times before any symptoms showed themselves, while in others, on the contrary, once was sufficient.

3. It appears that in a state of doubtful rabies, one or two accidental or artificial inoculations are not sufficient to create a negative proof of its existence.

4. This disease has never been communicated to an individual from one infected by means of the perspirable matter; this, therefore, is a proof that the contagious part of the disease is not of a volatile nature.

5. It does not only exist in the saliva and the mucus of the mouth, but likewise in the blood and the parenchyma of the salivary glands; but not in the pulpy substance of the nerves.

6. The power of communicating infection is found to exist in all stages of the confirmed disease, even twenty-four hours after the decease of the rabid animal.

7. The morbid virus, when administered internally, appears to be incapable of communicating this disease; inasmuch as of twenty dogs to whom was given a certain quantity, not one exhibited the least symptom of rabies.

8. The application of the saliva upon recent wounds appears to have been as often succeeded by confirmed rabies as when the dog had been bitten by a rabid animal.

9. It cannot now be doubted that the disease is produced by the wound itself, as was supposed by M. Girard of Lyons, not by the fright of the individual, according to the opinion of others, but only from the absorption of the morbid virus from its surface.

10. Several experiments have proved to me the little reliance there is to be placed on the opinions of Baden and Capello, who believe that, in those dogs who become rabid after the bite of an animal previously attacked with this disease, the contagious properties of the saliva is not continued, but only exists in those primarily bitten.

11. During the period of incubation of the virus, there are no morbid, local, or general alterations of structure or function to be seen in the infected animal; neither are there any vesicles to be perceived on the inferior surface of the tongue, nor any previous symptoms which are found in other contagious diseases.

12. This disease is generally at its height at the end of fifty days after either artificial or accidental inoculation; and the author has never known it to manifest itself at a later period.

13. It is quite an erroneous idea to suppose that dogs in a state of health are enabled to distinguish, at first sight, a rabid animal, inasmuch as they never refuse their food when mixed with the secretions of those infected.*

The following singular trial respecting the death of a child by hydrophobia is worth quoting:—

Jones v. Parry.—The plaintiff is a labourer, who gets only fourteen shillings a-week to support himself and his family. The defendant is his neighbour, and keeps a public-house. This was an action brought by the plaintiff to recover damages against the defendant for the loss of his son, seven years of age, who was bitten by the defendant's dog, and afterwards became affected with rabies, of which disease he died.

It appeared in the evidence that the defendant's dog had, some time ago, been bitten by another dog; in consequence of which this dog was tied in the cellar, but the length of the rope which was allowed him enabled him to go to a considerable distance. The plaintiff's child knew the dog, having often played with him when he was at large. Some time ago the child crossed the street, near to the place where the dog was fastened, who rushed out of the place in which he was confined to where the child stood, sprung upon him, and bit him sadly in the face, and afterwards violently shook him. The child being thus wounded, a surgeon was sent for, who, after having dressed him, and attended him for a certain time, gave directions that he should be taken to the sea-side, and bathed in the salt water.

This having been continued for some time, the child was brought home, and, at the expiration of a month from the day on which he was bitten, became evidently and strangely ill. The surgeon proved beyond all shadow of doubt that the child laboured under rabies; that he had the never-failing symptoms of that dreadful affliction; and that, a little while before he expired, he even barked like a dog. The surgeon's charge to the father for his attendance was £1 6s. 6d., which, together with the charge of the undertaker for the funeral of the child, amounted to between six and seven pounds. Application was made to the defendant

to defray this expense, which at first he expressed a willingness to comply with, but afterwards refused; upon which this action was brought.

After some time the defendant offered to pay the plaintiff the sum of £6 3s. 6d., and the expense of the funeral and the surgeon, provided the plaintiff would bear the expenses of the lawsuit, which he was not in a condition to do, as probably it would amount to more than that money. On this account, therefore, the action was now brought into court. There was no proof that the defendant knew or suspected his dog to be mad, previously to his attacking the boy; but an animal known to have been bitten by a mad dog, ought either to have been at once destroyed, or so secured that it was impossible for him to do mischief.

Lord Kenyon observed to the jury that this was one of those causes which came home to the feelings of all, yet must not be carried farther than justice demanded. A cause like this never, perhaps, before occurred in a court of justice; but there had been many resembling it in point of principle. If a dog, known to be ill-tempered and vicious, did any person an injury without provocation, there could be no question that the owner the dog was answerable, in a court of justice, for the injury inflicted. Here was a worse case. The dog by whom the child was bitten had been attacked by another that was undeniably rabid. His master was aware of this, and placed him in a state of partial confinement—a confinement so lax, and so inefficient, that this poor child had broken through it, and was bitten, and died. What other people would have done in such a situation he could not tell; but, if he were asked what he would do, he answered, he certainly would kill the dog, however much of a favourite he had been, because no atonement was within the reach of his fortune to make to the injured party for such a dreadful visitation of Providence as this. It was not enough for the owner of such a dog to say, he took precaution to prevent mischief; he ought to have made it impossible that mischief could happen; and, therefore, as soon as there was any reasonable suspicion that the dog was rabid, he ought to have destroyed him.

But, if the owner wished to save the animal until he was satisfied of the actual state of the case, he ought to have secured him, so that every individual might be safe. Whether the defendant thought he had done all that was necessary, his lordship did not know; but this he knew, that the dog was not perfectly secured, otherwise this misfortune could not have happened.

The care which the defendant took in this case was not enough, and, therefore, he had no doubt that this action was maintainable. The jury would judge what damages they ought to give. He would refer this to their feelings. They could

* *Journal Pratique de Méd. Vét.*

not avoid commiserating the distress of the family of this poor man. He should, however, observe to the jury, that they must not give vindictive damages; but still he did not think that damages merely to the amount of £6 or £7, which was stated to be the expense of the funeral, &c., would at all meet the justice of the case. He was inclined to advise them to go beyond that, although he did not plead vindictive damages. There would be costs to be defrayed by the plaintiff, well known in the profession under the head of "extra costs," even although he had a verdict. If the verdict had been at his disposal, he would have taken care that these costs should have been borne by the party that had been the cause of the injury. That appeared to him to be the justice of the case.

He trusted that none who heard him would doubt his sincerity, when he said he lamented the misfortune which had given birth to this action; and, with that qualification of the case, he must say that he was not sorry that this action had been brought. He thanked the plaintiff for bringing it; for it might be of public benefit. It would teach a lesson that would not soon be forgotten, "That a person who knowingly keeps a vicious, dangerous animal, should be considered to be an-

swerable for all the acts of that animal." There were instances in which very large damages had been given to repair such injuries. He did not say that the present case called for large damages; but if other cases of the same kind should be brought into court after this had been made public, he hoped the jury would go beyond the ordinary limits, and give verdicts which might operate *in terrorem* on the offending parties.

Verdict for the plaintiff—damages £36.*

A child was bitten by a rabid dog at York, and became hydrophobous. All possibility of relief having vanished, the parents, desirous of putting an end to the agony of their child, or fearful of its doing mischief, smothered it between two pillows. They were tried for murder, and found guilty. They were afterwards pardoned; but the intention of the prosecutor was that of deterring others from a similar practice, in a like unfortunate situation.†

In 1821, a physician, at Poissy, was sentenced to pay 8000 francs (£320) to a poor widow whose husband died of hydrophobia, in consequence of a bite from the physician's dog, he knowing that the dog had been bitten, yet not confining him.

CHAPTER VIII.

THE EYE AND ITS DISEASES.

THE diseases that attack the same organ are essentially different, in different animals, in their symptoms, intensity, progress, and mode of treatment. In periodic ophthalmia—that pest of the equine race and opprobrium of the veterinary profession—the cornea becomes suddenly opaque, the iris pale, the aqueous humour turbid, the capsule of the lens cloudy, and blindness is the result. After a time, however, the cornea clears up, and becomes as bright as ever; but the lens continues impervious to light, and vision is lost.

Ophthalmia in the dog presents us with symptoms altogether different. The conjunctiva is red; that portion of it which spreads over the sclerótica is highly injected, and the cornea is opaque. As the disease proceeds, and even at a very early period of its progress, an ulcer appears on the centre; at first superficial, but enlarging and deepening until it has penetrated the cornea, and the aqueous humour has escaped. Granulations then spring from the edges of the ulcer, rapidly enlarge, and protrude through the lids. Under proper treatment, however, or by a process of nature, these

granulations cease to sprout; they begin to disappear; the ulcer diminishes; it heals; scarcely a trace of it can be seen; the cornea recovers its perfect transparency, and vision is not in the slightest degree impaired.

There is a state of the orbit which requires some consideration. It is connected with the muscles employed in mastication. Generally speaking, the food of the dog requires no extraordinary degree of mastication, nor is there usually any great time employed in this operation. That muscle which is most employed in the comminution of the food, namely, the temporal muscle, has its action very much limited by the position of the bony socket of the eye; yet sufficient room is left for all the force that can be required. In some dogs, either for purposes of offence or defence, or the more effectual grasping of the prey, a sudden violent exertion of muscular power, and a consequent contraction of the temporal muscle, are requisite, but for which the imperfect socket of the orbit does not seem to afford sufficient scope and

* Sporting Magazine, vol. xviii., p. 186.

† Daniel's Rural Sports, vol. i., p. 220.

room. There is an admirable provision for this in the removal of a certain portion of the orbital process of the frontal bone on the outer and upper part of the external ridge, and the substitution of an elastic cartilage. This cartilage momentarily yields to the swelling of the muscles; and then, by its inherent elasticity, the external ridge of the orbit resumes its pristine form. The orbit of the dog, the pig, and the cat, exhibits this singular mechanism.

The horse is, to a certain extent, also an illustration of this. He requires an extended field of vision to warn him of the approach of his enemies in his wild state, and a direction of the orbits somewhat forward to enable him to pursue with safety the headlong course to which we sometimes urge him; and for this purpose his eyes are placed more forward than those of cattle, sheep, or swine. That which Mr. Percivall states of the horse is true of our other domesticated animals:—"The eyeball is placed within the anterior or more capacious part of the orbit, nearer to the frontal than to the temporal side, with a degree of prominence peculiar to the individual, and, within certain limits, variable at his will."

In many of the carnivorous animals the orbit encroaches on the bones of the face. A singular effect is also produced on the countenance, both when the animal is growling over his prey and when he is devouring it. The temporal muscle is violently acted upon; it presses upon the cartilage that forms part of the external ridge; that again forces itself upon and protrudes the eye, and hence the peculiar ferocity of expression which is observed at that time. The victims of these carnivorous animals are also somewhat provided against danger by the acuteness of sight with which they are gifted. Adipose matter also exists in a considerable quantity in the orbit of the eye, which enables it to revolve by the slightest contraction of the muscles.

We should scarcely expect to meet with cases of fracture of the orbital arch in the dog, because, in that animal, cartilage, or a cartilago-ligamentous substance, occupies a very considerable part of that arch; but I have again and again, among the cruelties that are practised on the inferior creation, seen the cartilage partly, or even entirely, torn asunder. I have never been able satisfactorily to ascertain the existence of this during life, but I have found it on those whom I have recommended to be destroyed on account of the brutal usage which they had experienced. Blows somewhat higher, or on the thick temporal muscle of this animal, will very rarely produce a fracture.

A few cases of disease in the eye may be interesting and useful.

Case I.—The eyes of a favourite spaniel were found inflamed and impatient of light. Nothing

wrong had been perceived on the preceding day. No ulceration could be observed on the cornea, and there was but a slight mucous discharge. An infusion of digitalis, with twenty times the quantity of tepid water, was employed as a collyrium, and an aloetic ball administered. On the following day the eyes were more inflamed. The collyrium and the aloes were employed as before, and a seton inserted in the poll.

Three or four days afterwards, the redness was much diminished, the discharge from the eye considerably lessened, and the dog was sent home. The seton, however, was continued, with an aloetic ball on every third or fourth day.

Two or three days after this the eyes were perfectly cured and the seton removed.

Case II.—The eye is much inflamed, and the brow considerably protruded.

This was supposed to be caused by a bite. I vainly endeavoured to bring the lid over the swelling. I scarified the lid freely, and ordered the bleeding to be encouraged by the constant application of warm water, and a physic-ball to be given.

On the following day the brow was found to be scarcely or at all reduced, and the eye could not be closed. I drew out the haw with a crooked needle, and cut it off closely with sharp scissors. The excised portion was as large as a small kidney-bean. The fomentation was continued five days afterwards, and the patient then dismissed cured.

Case III.—A pointer was brought in a sad state of mange. Redness, scurf, and eruptions were on almost every part. Apply the mange ointment and the alterative and physic balls. On the following day there was an ulcer on the centre of the cornea, with much appearance of pain and impatience of light. Apply an infusion of digitalis, with the liquor plumbi diacetatis. He was taken away on the twelfth day, the mange apparently cured, and the inflammation of the eye considerably lessened. A fortnight afterwards this also appeared to be cured.

Case IV.—A spaniel had been bitten by a large dog. There was no wound of the lids, but the eye was protruded from the socket. I first tried whether it could be reduced by gentle pressure, but I could not accomplish it. I then introduced the blunt end of a curved needle between the eye and the lid; and thus drawing up the lid with the right hand, while I pressed gently on the eye with the left hand, I accomplished my object. I then subtracted three ounces of blood, and gave a physic-ball. On the following day the eye was hot and red, with some tumefaction. The pupil was moderately contracted, but was scarcely affected by any change of light. The dog was sent home with some extract of

Goulard, and a fortnight afterwards was quite well.

Case V.—A dog received a violent blow on the right eye. Immediate blindness occurred, or the dog could apparently just discern the difference between light and darkness, but could not distinguish particular objects. The pupil was expanded and immovable. A pink-coloured hue could be perceived on looking earnestly into the eye. A seton was introduced into the poll, kept there nearly a month, and often stimulated rather sharply. General remedies of almost every kind were tried: depletion was carried to its full extent, the electric fluid was had recourse to; but at the expiration of nine weeks the case was abandoned and the dog destroyed. Permission to examine him was refused.

I have, in two or three instances, witnessed decided cases of dropsy of the eye, accumulation of fluid taking place in both the anterior and posterior chambers of the eye; there was also effusion of blood in the chambers, but in one case only was there the slightest benefit produced by the treatment adopted, and in that there was gradual absorption of the effused fluid.

About the same time there was another similar case. A pointer had suddenly considerable opacity of one eye, without any known cause; the other eye was not in the least degree affected. The dog had not been out of the garden for more than a week. The eye was ordered to be fomented with warm water.

On the following day the inflammation had increased, and the adipose matter was protruded at both the inner and outer canthus. The eye was bathed frequently with a Goulard lotion. On the fourth day the eyeball was still more inflamed, and the projections at both canthi were increased. A curved needle was passed through both eyes, and there was considerable bleeding. On the following day the inflammation began to subside. At the expiration of a week scarcely any disease remained, and the eye became as transparent as ever.

A curious case of congenital blindness was brought to my infirmary. A female pointer puppy, eight weeks old, had both her eyes of their natural size and formation, but the inner edge of the iris was strangely diseased. The pupil was curiously four-cornered, and very small. There hung out of the pupil a greyish-white fibrous matter, which appeared to be the remainder of the pupillary membrane.

Six months afterwards we examined her again, and found that the pupil was considerably enlarged, and properly shaped, and the white skin had vanished. In the back-ground of the eye there was a faint yellow-green light, and the dog not only showed sensibility to light, but some per-

ception of external objects. At this period we lost sight of her.

A very considerable improvement has taken place with regard to the treatment of the enlarged or protruded ball of the eye. A dog may get into a skirmish, and have his eye forced from the socket. If there is little or no bleeding, the case will probably be easily and successfully treated.

The eye must first be thoroughly washed, and not a particle of grit must be left. A little oil, a crooked needle, and a small piece of soft rag should be procured. The blunt end of the needle should be dipped into the oil, and run round the inside of the lid, first above and then below. The operator will next—his fingers being oiled—press upon the protruded eye gently yet somewhat firmly, changing the pressure from one part of the eye to the other, in order to force it back into the socket.

If, after a couple of minutes' trial, he does not succeed, let him again oil the eye on the inside and the out, and once more introduce the blunt end of the needle, attempting to carry it upwards under the lid with two or three fingers pressing on the eye, and the points of pressure being frequently changed. In by far the greater number of cases the eye will be saved.

If it is impracticable to cause the eye to retract, a needle with a thread attached must be passed through it, the eye being then drawn as forward as possible, and cut off close to the lids. The bleeding will soon cease, and the lids perfectly close.

Ophthalmia is a disease to which the dog is often liable. It is the result of exposure either to heat or to cold, or violent exertion; it is remedied by bleeding, purging, and the application of sedative medicines, as the acetate of lead or the tincture of opium. When the eye is considerably inflamed, in addition to the application of tepid or cold water, either the inside of the lids or the white of the eye may be lightly touched with the lancet. From exposure to cold, or accident, or violence, inflammation often spreads on the eye to a considerable degree, the pupil is clouded, and small streaks of blood spread over the opaque cornea. The mode of treatment just described must be pursued.

The crystalline lens occasionally becomes opaque. There is cataract. It may be the result of external injury or of internal predisposition. Old dogs are particularly subject to cataract. That which arises from accident, or occasionally disease, may, although seldom, be reinstated, especially in the young dog, and both eyes may become sound; but, in the old, the slow-growing opacity will, almost to a certainty, terminate in cataract.

There is occasionally an enlargement of the

eye, or rather an accumulation of fluid within the eye, to a very considerable extent. No external application seems to have the slightest effect in reducing the bulk of the eye. If it is punctured, much inflammation ensues, and the eye gradually wastes away.

In *amaurosis*, the eye is beautifully clear, and, for a little while, this clearness imposes upon the casual observer; but there is a peculiar pellucid appearance about the eye—a preternatural and unchanging brightness. In the horse, the sight occasionally returns, but I have never seen this in the dog.

The occasional glittering of the eyes of the dog has been often observed. The cat, the wolf, some carnivora, and also sheep, cows, and horses, occasionally exhibit the same glittering. Pallas imagined that the light of these animals emanated from the nervous membrane of the eye, and considered it to be an electrical phenomenon. It is found, however, in every animal that possesses a *tapetum lucidum*. The shining, however, never takes place in complete darkness. It is neither produced voluntarily, nor in consequence of any moral emotion, but solely from the reflection that falls on the eye.

CHAPTER IX.

THE EAR AND ITS DISEASES.

Canker in the Ear.—All water-dogs, and some others, are subject to a disease designated by this name, and which, in fact, is inflammation of the integumental lining of the inside of the ear. When the whole of the body, except the head and ears, is surrounded by cold water, there will be an unusual determination of blood to those parts, and consequent detension of the vessels and a predisposition to inflammation. A Newfoundland dog, or setter, or poodle, that has been subject to canker, is often freed from a return of the disease by being kept from the water.

The earliest symptom of the approach of canker is frequent shaking of the head, or holding of the head on one side, or violent scratching of one or both ears. Redness of the integument may then be observed, and particularly of that portion of it which lines the annular cartilage. This is usually accompanied by some enlargement of the folds of the skin. As soon as any of these symptoms are observed, the ear should be gently but well washed, two or three times in the day, with lukewarm water, and after that a weak solution of the extract of lead should be applied, and a dose or two of physic administered.

If the case is neglected, the pain will rapidly increase; the ear will become of an intenser red; the folds of the integument will enlarge, and there will be a deposition of red or black matter in the hollow of the ear. The case is now more serious, and should be immediately attended to. This black or bloody deposit should be gently but carefully washed away with warm water and soap; and the extract of lead, in the proportion of a scruple to an ounce of water, should be frequently applied until the redness and heat are abated. A solution of alum, in about the same quantity of

alum and water as the foregoing lotion, should then be used.

Some attention should be paid to the method of applying these lotions. Two persons will be required in order to accomplish the operation. The surgeon must hold the muzzle of the dog with one hand, and have the root of the ear in the hollow of the other, and between the first finger and the thumb. The assistant must then pour the liquid into the ear; half a tea-spoonful will usually be sufficient. The surgeon, without quitting the dog, will then close the ear, and mould it gently until the liquid has insinuated itself as deeply as possible into the passages of the ear. Should not the inflammation abate in the course of a few days, a seton should be inserted in the poll, between the integument and the muscles of the occiput, reaching from ear to ear. The excitement of a new inflammation, so near to the part previously diseased, will materially abate the original affection. Physic is now indispensable. From half a drachm to a drachm of aloes, with from one to two grains of calomel, should be given every third day.

Should the complaint have been much neglected, or the inflammation so great as to bid defiance to these means, ulceration will too often speedily follow. It will be found lodged deep in the passage, and can only be detected by moulding the ear; the effused pus will occasionally occupy the inside of the ear to its very tip. However extensive and annoying the inflammation may be, and occasionally causing so much thickening of the integument as perfectly to close the ear, it is always superficial. It will generally yield to proper treatment, and the cartilage of the ear may not be in the slightest degree affected. Still

however, the animal may suffer extreme pain; the discharge from the ulcer may produce extensive excoriation of the cheek; and, in a few cases, the system may sympathize with the excessive local application, and the animal may be lost.

The treatment must vary with circumstances. If the ulceration is deep in the ear, and there is not a very great degree of apparent inflammation, recourse may be had at once to a stimulating and astringent application, such as alum or the sulphate of zinc, and in the proportion of six grains of either to an ounce of water. If, however, the ulceration occupies the greater part of the hollow of the ear, and is accompanied by much thickening of the integument, and apparent filling up of the entrance to the ear, some portion of the inflammation must be first subdued.

The only chance of getting rid of the disease is to confine the ear. A piece of strong calico must be procured, six or eight inches in width, and sufficiently long to reach round the head and meet under the jaw. Along each side of it must be a running piece of tape, and a shorter piece sewed at the centre of each of the ends. By means of these the cap may be drawn tightly over the head, above the eyes, and likewise round the neck behind the ears, so as perfectly to confine them.

After all, no mild ointment will dispose such an ulcer to heal, and recourse must be had at once to a caustic application. A scruple of the nitrate of silver must be rubbed down with an ounce of lard, and a little of it applied twice every day, and rubbed tolerably hard into the sore until it assumes a healthy appearance; it may then be dressed with the common calamine ointment.

If the discharge should return, the practitioner must again have recourse to the caustic ointment.

The cartilage will never close, but the integument will gradually cover the exposed edges, and the wound will be healed. The ear will, however, long continue tender, and, if it should be much beaten, by the shaking of the head, the ulcer will reappear. This must be obviated by occasionally confining the ears and not overfeeding the dog.

Some sportsmen are accustomed to *round* the ears, that is to cut off the diseased part. In very few instances, however, will a permanent cure be effected, while the dog is often sadly disfigured. A fresh ulcer frequently appears on the new edge, and is more difficult to heal than the original one. Nine times out of ten the disease reappears.

The Newfoundland dog is very subject to this disease, to remedy which recourse must be had to the nitrate of silver.

Spaniels have often a mangy inflammation of the edges of the ear. It seldom runs on to canker; but the hair comes off round the edges of the ear, accompanied by much heat and scurfiness of the skin. The common sulphur ointment, with

an eighth part of mercurial ointment, will usually remove the disease.

From the irritation produced by canker in or on the ear, and the constant flapping and beating of the ear, there is sometimes a considerable effusion of fluid between the integument and the cartilage occupying the whole of the inside of the flap of the ear. The only remedy is to open the enlarged part from end to end, carefully to take out the gossamer lining of the cyst, and then to insert some bits of lint on each side of the incision, in order to prevent its closing too soon. In a few days, the parietes of the cyst will begin to adhere, and a perfect cure will be accomplished.

If the tumour is simply punctured, the incision will speedily close, and the cyst will fill again in the space of four-and-twenty hours. A seton may be used, but it is more painful to the dog, and slower in its operation.

The ear should be frequently fomented with a decoction of white poppies, and to this should follow the Goulard lotion; and, after that, if necessary, a solution of alum should be applied. To the soreness or scabby eruption, which extends higher up the ear, olive oil or spermaceti ointment may be applied. In some cases, portions of the thickened skin, projecting and excoriated, and pressing on each other, unite, and the opening into the ear is then mechanically filled. I know not of any remedy for this. It is useless to perforate the adventitious substance, for the orifice will soon close; and, more than once, when I have made a crucial incision, and cut out the unnatural mass that closed the passage, I have found it impossible to keep down the fungous granulations or to prevent total deafness.

The following is a singular case of this disease:—1st July, 1820, a dog was sent with a tumour, evidently containing a fluid, in the flap of the ear. A seton had been introduced, but had been sadly neglected. The hair had become matted round the seton, and the discharge had thus been stopped. Inflammation and considerable pain had evidently followed, and the dog had nearly torn the seton out. I removed it, washed the ear well, and applied the tincture of myrrh and aloes. The wound soon healed. On the 14th the ear began again to fill. On the 17th the tumour was ripe for the seton, which was again introduced, and worn until the 9th of August, when the sides of the abscess appeared again to have adhered, and it was withdrawn. Canker had continued in the ear during the whole time; and, in defiance of a cold lotion daily applied, the ear was perceived again to be disposed to fill. The seton was once more inserted, and the cyst apparently closed. The seton was continued a fortnight after the sinus was obliterated, and then removed. Six weeks

afterwards the swelling had disappeared, and the canker was quite removed. This anecdote is an encouragement to persevere under the most disheartening circumstances.

All dogs that are foolishly suffered to become gross and fat are subject to canker. It seems to be a natural outlet for excess of nutriment or gross humour; and, when a dog has once laboured under the disease, he is very subject to a return of it. The fatal power of habit is in few cases more evident than in this disease. When a dog has symptoms of mange, the redness or eruption of the skin, generally, will not unfrequently disappear, and bad canker speedily follow. The habit, however, may be subdued, or at least may be kept at bay, by physic and the use of Goulard lotion or alum.

Sportsmen are often annoyed by another species of canker. Pointers and hounds are particularly subject to it.

This species of canker commences with a scurfy eruption and thickening of the edges of the ear, apparently attended by considerable itching or pain. The dog is continually flapping his ear, and beating it violently against his head. The inflammation is thus increased, and the tip of the ear becomes exceedingly sore. This causes him to shake his head still more violently, and the ulcer spreads and is indisposed to heal, and at length a fissure or crack appears on the tip of the cartilage, and extends to a greater or less distance down the ear.

The narration of one or two cases may be useful as showing the inveteracy of the disease.

8th Feb. 1832.—A Newfoundland dog, very fat, had dreadful canker in both ears, and considerable discharge of purulent matter. He was continually shaking his ears, lying and moaning. Apply the canker lotion, and give the alterative balls.

13th. The discharge considerably lessened from one ear, but that from the other has increased. Continue the lotion and apply a seton.

22nd. The dog, probably neglected at home, was sent to me. Both ears were as bad as ever.

25th. The dog is perfectly unmanageable when the lotion is poured into the ear, but submits when an ointment is applied. Use ung. sambuci, 3j. cerus. acet. 3j., mix well together. Continue the alteratives.

30th. Slowly amending; the whining has ceased, and the animal seldom scratches. Continue the lotion, alteratives, and purgatives.

10th Oct.—Slowly improving. Continue the treatment.

17th. One ear well, the other nearly so.

24th. Both ears were apparently well. Omit the lotion.

28th. One ear was again ulcerated. Applied the *æruo æris*.

31st. This has been too stimulating, and the ulceration is almost as great as at first. Return to the ung. sambuci and cerusa acetata.

From this time to the 24th February, 1833, we continued occasionally taking out the seton, but returning to it every two or three days; applying the canker lotion until we were driven from it, mixing with it variable quantities of tinctura opii, having recourse to mercurial ointment, and trying a solution of the sulphate of copper. With two or three applications we could keep the disease at bay; but with none could we fairly remove the evil. The sulphate of zinc, the acetate of lead, decoctions of oak bark, a very mild injection of the nitrate of silver—all would do good at times; but at other times we were set at complete defiance.

Another gentleman brought his dog about the same time. This was also a Newfoundland dog. He had always been subject to mangy eruptions, and had now mange in the feet, the inside of the ear covered with scaly eruptions, the skin red underneath, considerable thickening of the ear, and a slight discharge from its base. A seton was inserted and a physic-ball given every second day. The canker lotion had little good effect. Some calamine ointment, with a small portion of calomel, was then had recourse to.

In ten days the dog had ceased to scratch himself or shake his head, and the ear was clean and cool. The seton was removed; but the animal being confined, a little redness again appeared in the ear, which the lotion soon removed.

At the expiration of a month he was dismissed apparently cured; but he afterwards had a return of his old mangy complaints, which bade defiance to every mode of treatment.

Herr Maassen, V. S., Wurtemberg, has lately introduced, and with much success, the use of creosote for the cure of canker in the ear.

The first experiment was on a setter with canker in his ear. The owner of the dog had ordered it to be bled, as all remedies had failed in producing a cure. Herr Maassen prescribed creosoti 3ss. et spirit. vini rectificat. 3ij. This mixture was applied once in every day to the diseased part. In a few weeks the dog was completely cured, and has since had no return of the complaint. In a terrier, and also in three spaniels, the effect of this application was equally satisfactory. In some cases, where the disease showed itself in a less degree, the creosote was dissolved in water, instead of spirit of wine. It is always necessary to take away the collar while the dog is under treatment, in order that the flap of the ear may not be injured by striking against it.

Vegetating Excrescences in the Ear. (By F. J.

J. Rigot.)—Productions of this kind, which he had the opportunity of observing only once, are sometimes united in masses, and completely close the auditive canal. The surface is granulated and black, and there escapes from it an unctuous fetid discharge. On both sides the animal is exceedingly susceptible of pain, and the excrescences bleed if the slightest pressure is brought to bear upon them.

He thought it right to cut away these excrescences bodily, which he found to be composed of a strong dense tissue, permitting much blood to escape through an innumerable quantity of vascular openings. They were reproduced with extreme promptitude after they had been cut off or cauterized. Some of them appeared no more after being destroyed by the nitrate of mercury.

Sometimes, however, twenty-four hours after a simple incision, not followed by cauterization, these productions acquire an almost incredible size. It seemed, in M. Rigot's case, to be impossible to conquer the evil, and the patient was destroyed.

Eruptions in the Ear.—A Newfoundland dog had long been subject to mangy eruptions on the back and in the feet. They had suddenly disappeared, and the whole of the inside of the ear became covered with scaly eruptions. The skin was red; there was considerable thickening of the ear, and a discharge from the base of it. The canker-lotion was used, a physic-ball given every second day, and a seton inserted in the poll, reaching from ear to ear. No apparent benefit resulted. A little calamine ointment, to which was added one-eighth part of mercurial ointment, was then tried, and considerable benefit immediately experienced. The dog no longer continued to scratch himself or to shake his head, and the ear became clean and cool. The seton was removed, and nothing remained but a little occasional redness, which the lotion very soon dispersed.

The owner, however, became ultimately tired of all this doctoring, and the animal was destroyed.

A poodle had had exceedingly bad ears during several months. There was considerable discharge, apparently giving much pain. The dog was continually shaking his head and crying. A seton was introduced, the canker-lotion was resorted to, and alterative and purgative medicines exhibited. On the 29th of December the discharge from the ear ceased; but, owing to the neglect of the servant, it soon broke out again, and there was not only much excoriation under the ear, but, from the matting of the hair, deep ulcers formed on either side, the edges of the wound were ragged, and the skin was detached from the muscular parts beneath. Probes were introduced on each side,

which passed down the neck and nearly met. The smell was intolerably offensive, and the dog was reduced almost to a skeleton. I was, for the second time, sent for to see the case. I immediately recommended that the animal should be destroyed; but this was not permitted. I then ordered that it should daily be carefully washed, and diluted tincture of myrrh be applied to the wounds. They showed no disposition to heal, and the dog gradually sunk under the continued discharge and died.

Violent Affection of the Ear. 20th May, 1828.

—A spaniel screamed violently, even when it was not touched, and held its head permanently on one side, as if the muscles were contracted. The glands beneath the ear were enlarged, but the bowels were regular; the nose was not hot; there was no cough. A warm bath was ordered, with aperient medicine.

On the 22nd she was no better. I examined the case more carefully. The left ear was exceedingly hot and tender: she would scarcely bear me to touch it. I continued the aperient medicine, and ordered a warm lotion to be applied, consisting of the liquor plumbi acetatis and infusion of digitalis. She improved from the first application of it, and in a few days was quite well. A fortnight afterwards the pain returned. The lotion was employed, but not with the same success. A seton was then applied. She wore it only four days, when the pain completely disappeared.

I have an account in my records of the conduct of a coward, who, coming from such a breed, was not worthy of the trouble we took with him. He was a Newfoundland dog, two years old, with considerable enlargement, redness, and some discharge from both ears. He was sent to our hospital for treatment. When no one was near him, he shook his head and scratched his ears, and howled dreadfully. Many times in the course of the day he cried as if we were murdering him. We sent him home thoroughly well, and glad we were to get rid of him.

Cropping of the Ears.—I had some doubt whether I ought not to omit the mention of this cruel practice. Mr. Blaine very properly says, that "it is one that does not honour the inventor, for nature gives nothing in vain. Beauty and utility appear in all when properly examined, but in unequal degrees. In some, beauty is pre-eminent; while, in others, utility appears to have been the principal consideration. That must, therefore, be a false taste, that has taught us to prefer a *curtailed* organ to a perfect one, without gaining any convenience by the operation." He adds, and it is my only excuse for saying one word about the matter, that "custom being now fixed, directions are proper for its performance."

The owner of the dog commences with maiming him while a puppy. He finds fault with the ears that nature has given him, and they are rounded or cut into various shapes, according to his whim or caprice. It is a cruel operation. A great deal of pain is inflicted by it, and it is often a long time before the edge of the wound will heal: a fortnight or three weeks at least will elapse ere the animal is free from pain.

It has been pleaded, and I would be one of the last to oppose the plea, that the ears of many dogs are rounded on account of the ulcers which attack and rend the conch; because animals with short ears defend themselves most readily from the attacks of others; because, in their combats with each other, they generally endeavour to lay hold of the neck or the ears; and, therefore, when their ears are shortened, they have considerable advantage over their adversary. There is some truth in this plea; but, otherwise, the operation of cropping is dependent on caprice or fashion.

If the ears of dogs must be cropped, it should not be done too early. Four, five, or six weeks should first pass; otherwise, they will grow again, and the second cropping will not produce a good appearance.

The scissors are the proper instruments for accomplishing the removal of the ear; the tearing of the cartilages out by main force is an act of cruelty that none but a brute in human shape would practise; and, if he attempts it, it is ten to one that he does not obtain a good crop. If the conch is torn out, there is nothing remaining to retain the skin round the auricular opening; it may be torn within the auditory canal, and as that is otherwise very extensible in the dog, it is prolonged above the opening, which may then probably be closed by a cicatrix. The animal will in this case always remain deaf, at least in one ear. In the meantime, the mucous membrane that lines the *meatus auditorius* subsists, the secretion of the wax continues; it accumulates and acquires an irritating quality; the irritation which it causes produces an augmentation of the secretion, and soon the whole of the subcutaneous passage becomes filled, and seems to assume the form of a cord; and it finishes by the dog continuing to worry himself, shaking his head, and becoming subject to fits.

Mr. Blaine very naturally observes, that "it is not a little surprising that this cruel custom is so frequently, or almost invariably, practised on pug-dogs, whose ears, if left alone to nature, are particularly handsome, and hang very gracefully. It is hardly to be conceived how the pug's head—which is not naturally beautiful except in the eye of perverted taste—is improved by suffering his ears to remain."

If the cropping is to be practised, the mother

should have been previously removed. It is quite erroneous, that her licking the wounded edges will be serviceable. On the contrary, it only increases their pain, and deprives the young ones of the best balsam that can be applied—the blood that flows from their wounds.

Polypi in the Ears.—Dr. Mercer, in *The Veterinarian*, of July, 1844, gives an interesting account of the production of polypi in the meatus of the ear. He considers that there are two kinds of polypi—first, the soft, vascular, and bleeding polypus, usually produced from the fibro-cartilaginous structure of the outer half of the tube; and, secondly, the hard and cartilaginous polypus or excrescence produced from the lining membrane of its inner half. The first is termed the hæmatoid polypus, and the other the chondromatous. The dog suffering under either generally has a dull, heavy, and rather watery eye. He moans or whines at intervals. If his master is present, he feels a relief in pressing and rubbing his aching ear against him. At other times he presses and rubs his ear against the ground, in order to obtain a slight relief, flapping his ears and shaking his head; the mouth being opened and the tongue protruded, and the affected ear pointing to the ground. Then comes a sudden, and often a profuse, discharge of fetid pus. The local discharge of pus and blood becomes daily more and more fetid, and the poor animal becomes an object of disgust.

In the first variety of polypus, where it is practicable, the soft and vascular excrescence should be excised with a pair of scissors or a small knife, or it may be noosed by a ligature of silk or of silver wire, or twisted off with a pair of forceps. Immediately after its removal, the base of the tumour should be carefully destroyed by the nitrate of silver, and this should be repeated as long as there is any appearance of renewed growth. Any ulcer or carious condition of the meatus should be immediately removed.

In order to protect the diseased parts, a soft cap should be used, and within the ear a little cotton wadding may defend the ear from injury.

Dr. Mercer very properly remarks that, in the second or chondromatous variety of polypus of the meatus, the treatment must depend upon the concomitant circumstances. If the tumour is seated close to the *membrana tympani*, and has a broad and sessile base, then it cannot be excised or noosed with any degree of success. It must therefore be treated by the daily application of the solid nitrate of silver, applied exactly to its surface; and in the intervals of application, the use of any collyria may be had recourse to. If the substance of the growth be firm and solid, and possesses little sensibility, then a very speedy mode of getting rid of it is to divide its substance with a

small knife; and, afterwards, by applying the solid nitrate of silver, the tumour will soon be sloughed away.

The dog is liable to polypi in the nasal cavity, in the anus, and in the vagina, which it will not be out of place to mention here.

The polypi of the nasal and of the anal cavities often show themselves under the form of rounded bodies, projecting from the nose or anus. Their size and consistence are variable—sometimes soft, tearing with the greatest facility, and bleeding at the slightest touch; at other times, solid and covered with pituitary membrane. They are generally the result of ulcerations, wounds, fractures, perforations of the turbinated bones, sinuses, &c. These polypous productions obstruct the passage of the air, and more or less impede the breathing. They are best extirpated by means of a ligature, or circular compression, on the pedicle of the polypus, and tightened every second day.

We may discover the presence of a tumour of this nature in one of the nasal passages, when, on putting our hand to the orifice of the nostril, there issues little or no air; or when we sound the nostril with the finger or a probe, or examine it on a bright day.

The methods of destroying polypi in the nasal cavity vary with the texture, size, form, and position of these excrescences. Excision with the bistoury, or with scissors, may be tried when the polypus is near the orifice of the nostril, and particularly when it is not large at the base. Excision should be followed by cauterization with the red-hot iron, by which a portion of the base of the tumour is destroyed, and which could not be reached by a sharp instrument. To succeed in these operations, it is frequently necessary to cut through the false nostril. The edges of the wound may afterwards be united by a suture.

The ligature, or circular compression, exercised immediately on the pedicle of the polypus, by means

of a wire or waxed string, and directed into the nasal cavity by means of a proper instrument, may be tried when the polypus is deeply situated, and particularly when its base is narrow. But, for this operation, which is difficult to perform, and which may be followed by a new polypous production, when the base is not perfectly destroyed, we may substitute the forcible detachment, especially when we have to act on vascular and soft excrescences.

The Italian greyhound is strangely subject to these polypi in the matrix or vagina. The reason it is difficult to explain.

A bitch, ten years old, was brought to the author on the 20th December, 1843, with an oval substance, as large as a thrush's egg, occasionally protruding from the vagina. I advised that it should be removed by means of a ligature; but the owner was afraid, and a fortnight was suffered to pass before she was brought again. The tumour had rapidly increased: it was as large as a pigeon's egg, considerably excoriated, and the pedicle being almost as large as the tumour itself. The operation was now consented to. I passed a ligature as firmly round the pedicle and as high up as I could. The bitch scarcely seemed to suffer any pain. *3rd Jan.* The circulation is evidently cut off, and the tumour is assuming a thoroughly black hue, but it appears to cause no inconvenience to the dog. I tightened the ligature. *4th.* The tumour is now completely black, considerably protruded, and apparently destitute of feeling. I again tightened the ligature. *5th.* The tumour not appearing disposed to separate, and the uterus seeming to be drawn back by its weight, I cut off the tumour close to the ligature. Not the slightest pain seemed to be given, and the tumour was hard and black. There was, however, a very little oozing of bloody fluid, which continuing to the 8th, I injected a slight injection of alum into the vagina, and three days afterwards the discharge was perfectly stopped.

CHAPTER X.

ANATOMY OF THE NOSE AND MOUTH; AND DISEASES OF THE NOSE AND OTHER PARTS OF THE FACE.
THE SENSE OF SMELL; THE TONGUE; THE LIPS; THE TEETH; THE LARYNX; BRONCHOCELE;
PHLEGMONOUS TUMOUR.

The Ethmoid Bones.—There is some difficulty in describing the ethmoid bones; but we shall not, however, deviate far from the truth if we give the following account:—

A great number of small hollow pedicles proceed from and form around the cribriform plate; as they move downwards, they project into distinct vesicles or cavities, smaller and more numerous behind, fewer in number and larger in front; and

each of them not a simple cavity, but more or less convoluted, while the long walls of those cells are of gossamer thinness, and as porous as gauze. They even communicate, and are lined, and externally wrapped together, by the same membrane; the whole assuming a pear-like form, attached by its base or greater extremity, and decreasing in size as it proceeds downwards; the cells becoming fewer, and terminating at length in a kind of apex,

which passes under the superior turbinated bone, and forms a valve between the nasal cavity and the maxillary sinuses. If to this is added, that the olfactory or first pair of nerves abut on these cribriform plates, and pass through their minute openings, and spread themselves over every one of these cells, we have a tolerably correct picture of this portion of the ethmoid bones. This nerve has different degrees of development in different animals, in proportion to their acuteness of smell. There is comparatively but little necessity for acuteness in the horse. The ox has occasion for somewhat more, especially in the early part of the spring, when the plants are young, and have not acquired their peculiar scent. In the sheep it is larger, and fills the superior portion of the nasal cavity; but in the dog it seems to occupy that cavity almost to the exclusion of the turbinated bones. It is also much more fragile in the dog than in the ox, and the plates have a considerably thinner structure.

The ethmoid bone of the horse or the ox may be removed from its situation with little injury; but that of the dog can scarcely be meddled with without fracture. Below it are the two turbinated bones; but they are reduced to insignificance by the bulk of the ethmoid bone. The inferior turbinated bone in the dog is very small, but it is curiously complicated.

The *meatus* contains three distinct channels; and the air, loitering, as it were, in it, and being longer in contact with the sensitive membrane by which it is lined, contributes to the acuter sense of smell. The larger cavity is along the floor of the nasal duct. It is the proper air-passage; and because it has this important function to discharge, it is out of the way of violence or injury.

The *lachrymal duct* is the channel through which the superfluous tears are conveyed to the lower parts of the nostril. A long canal here commences, and runs down and along the maxillary bone. It is very small, and terminates in the cuticle, in order that the highly sensitive membrane of the nose may not be excoriated by the tears occasionally rendered acrimonious in inflammation of the eye. The oval termination of this duct is easily brought into view by lifting the nostril.

From some occasional acrimony of the tears, the lining of this duct may be inflamed and thickened, or some foreign body, or some unctuous matter from the ciliary glands, may insinuate itself into the duct, and the fluid accumulates in the sac and distends it, and it bursts; or the ulcer eats through the integument, and there is a small fistulous opening beneath the inner canthus of the eye, or there is a constant discharge from it. It is this constant discharge that prevents the wound from healing. In some cases the lachrymal bone

is involved in the ulcerative process and becomes carious. In the dog, and particularly in the smaller spaniel, the watery eye, *fistula lacrymalis*, is of no unusual occurrence. The fistula will be recognised by a constant, although perhaps slight, discharge of pus.

The structure and office of the *velum palati*, or veil of the palate, is in the horse a perfect interposed section between the cavity of the mouth and the nose, and cutting off all communication between them. In the dog, who breathes almost entirely through the mouth, the *velum palati* is smaller; the tensor muscle, so beautifully described by Mr. Percivall, is weak, but the circumflex one is stronger and more developed. When *coryza* in the dog runs on to catarrh, and the membrane of the pharynx partakes of the inflammation, the *velum palati* becomes inflamed and thickened, but will not act as a perfect communication between the mouth and the nose. When there is a defluxion from the nose, tinged by the colour of the food, and particles of food mingle with it, we have one of the worst symptoms that can present itself, because it proves the extent and violence of the inflammation.

In inflammatory affections of the membrane of the nose in the dog, we often observe him snorting in a very peculiar way, with his head protruding, and the inspiration as forcible as the expiration. An emetic will usually afford relief, or grain doses of the sulphate of copper.

The Nasal Bones.—The nasal bones of the dog (see fig. 2, in the head of the dog, page 296) are very small, as they are in all carnivorous animals. Instead of constituting the roof, and part of the outer wall of the cavity, as in other animals, the nasal bones form only a portion, and a small one, of the roof.

The *superior maxillaries* here swell into importance, and constitute the whole of the outer wall, and, sometimes, a part of the roof. The jaws are the weapons of offence and defence; and as much space as possible is devoted to the insertion of those muscles that will enable the animal to seize and to hold his prey. One of the most powerful of them, the *masseter*, rises from the superior maxillary bone, and spreads over its whole extent: therefore, that bone is developed, while the nasal bone is compressed into a very small space. The substitution of a portion of cartilage, instead of bone, at the posterior part of the orbital ring, in order to give more play for the coracoid process of the posterior maxillary, round which the temporal bone is wrapped, is a contrivance of the same nature.

The scent of the dog is not sacrificed or impaired by the apparent diminution of the nasals; for the cavity enlarges considerably upward, and is occupied chiefly by the *ethmoid bone*, which,

having the greater portion of nervous pulp spread on it, seems to have most to do with the sense of smell.

The nasal bones of the dog are essentially different from those of the horse, cattle, and sheep. They commence, indeed, as high up in the face as those of the horse, their superior extremities being opposite to the lachrymal gland; but that commencement is an apex or point varying materially in different breeds. They form, altogether, one sharp projection, and are received within lengthened processes of the frontal bone on either side. In some breeds these processes extend nearly one-third of the length of the nasals.

The superior maxillary (3,3) takes the situation of the nasal (2), pushes the lachrymal bone (4) out of its place, and almost annihilates it, reaches the frontal bone (7) and expands upon it, and forms with it the same denticulated suture which is to be seen in the nasal. The action of the muscle between these bones, and for the development of which all this sacrifice is made, is exceedingly powerful. The strength of this muscle in a large dog is almost incredible: the sutures between these bones must possess corresponding strength; and so strong is the union between them, that, in many old dogs, the suture between the superior maxillary and frontal bones is nearly obliterated, and that between the nasal and frontal maxillary quite effaced.

As the nasal bones proceed downward they become somewhat wider. They unite with a long process of the anterior maxillary for the purpose of strength, and then terminate in a singular way. They have their apexes or points on the outer edge of the bone; and these apexes or points are so contrived that, lying upon, and seemingly losing themselves on, the processes of the anterior maxillary, they complete, superiorly and posteriorly, that elliptical bony opening into the nose which was commenced by the maxillary anteriorly and inferiorly. The nasal cavity of the dog, therefore, and of all carnivorous animals, terminates by a somewhat circular opening, more or less in the form of an ellipse. This bony aperture varies in size in different dogs, and, as we should expect from what we have seen of the adaptation of structure to the situation and wants of the animal, it is largest in those on whom we are most dependent for speed and stoutness.

The *olfactory*, or first pair of nerves, have a double origin—namely, from the *corpus striatum* and the base of the *corpus callosum*. They are prolongations of the medullary substance of the central portion of the brain. They are the largest of the cerebral nerves. Their course is exceedingly short; and they have not a single anastomosis, in order that the impression made on them may be conveyed undisturbed and perfect to the brain.

The olfactory nerve is a prolongation of the substance of the brain, and it abuts upon the cribiform bone, of which mention has been made. I will not speak of the singular cavities which it contains, nor of their function; this belongs to the sensorial system: but its pulpy matter has already been traced to the base of the ethmoid bone, and the under part of the septum, and the superior turbinated bone. Although we soon lose it in the mucous membrane of the nose, there is little doubt that in a more filmy form it is spread over the whole of the cavity, and probably over all the sinuses of the face and head. It is, however, so mingled with the mucous membrane, that no power of the lens has enabled us to follow it so far. It is like the *portio mollis* of the seventh pair, eluding the eye, but existing in sufficient substance for the performance of its important functions.

We have frequent cases of *ozæna* in old dogs, and sometimes in those that are younger. The discharge from the nostril is abundant and constant, and sometimes fetid. The Schneiderian membrane, of more than usual sensibility in this animal, is exposed to many causes of irritation, and debilitated and worn out before its time. Pugs are particularly subject to *ozæna*. I scarcely ever knew a very old pug that had it not to a greater or less degree. The peculiar depression between the nasal and frontal bones in this breed of dogs, while it almost totally obliterates the frontal sinuses, may narrow the air-passage at that spot, and cause greater irritation there from the unusual rush of the air, and especially if the membrane becomes inflamed or any foreign body insinuates itself.

Little can be done in these cases, except to encourage cleanliness about the face and nostrils. It is, in the majority of these cases, a disease of old age, and must take its course.

A terrier uttered a continual loud stertorous sound in breathing, which could be plainly heard in our parlour when the dog was in the hospital. The animal was evidently much oppressed and in considerable pain. He made continual, and generally ineffectual, efforts to sneeze. When he did succeed, a very small quantity of pus-like fluid was discharged; the dog was then considerably relieved, but a quarter of an hour afterwards he was as bad as ever. I ordered a slight emetic every third day. There was some relief for seven or eight hours, and then he was as bad as ever. I could neither feel nor see any cause of obstruction. The owner became tired, and the dog was taken away; but we could not learn what became of it.

Another terrier was occasionally brought for consultation. The dog breathed with considerable difficulty, and occasionally snorted with the

greatest violence, and bloody purulent matter was discharged; after which he was somewhat relieved; but, in the course of a few days, the obstruction was as great as ever. I am not aware of a single instance of this affection of the pug being completely removed. The discharge from the nostrils of the bull-dog is often considerable, and, once being thoroughly established, is almost as obstinate as in the pug.

THE SENSE OF SMELL.

In the dog we trace the triumph of *olfactory power*. How indistinct must be that scent which is communicated to, and lingers on, the ground by the momentary contact of the foot of the hare, the fox, or the deer; yet the hound, of various breeds, recognises it for hours, and some sportsmen have said for more than a day. He also can not only distinguish the scent of one species of animal from another, but that of different animals of the same species. The fox-hound, well broken in, will rarely challenge at the scent of the hare, nor will he be imposed upon when the crafty animal that he pursues has taken refuge in the earth, and thrusts out a new victim before the pack.

The sense of smelling is, to a certain degree, acute in all dogs. It is a provision wisely and kindly made, in order to guide them to their proper food, or to fit them for our service. It may possibly be the medium through which much evil is communicated. Certain particles of a deleterious nature may be, and doubtless are, arrested by the mucous membrane of the nose, and there absorbed, and the constitution, to a considerable degree, becomes affected. Hence appears the necessity for attention to ventilation, and especially to prevent the membrane of the nose from being habitually stimulated and debilitated by the effluvia generated in a close and hot kennel.

M. Majendie instituted some curious experiments on the sense of smelling, and he was led to believe that it depended more on the fifth pair of nerves than on the olfactory nerve. He divided the fifth pair, and from that moment no odour, no puncture, produced the slightest apparent impression on the membrane of the nose. In another dog he destroyed the two olfactory nerves, and placed some strong odours beneath the nostrils of the animal. The dog conducted himself as he would have done in his ordinary state. Hence he concluded it probable that the olfactory nerve was not that of smelling.

The simple fact, however, is, that there are two species of nerves here concerned—those of common and of peculiar sensation. The olfactory nerve is the nerve of smelling, the fifth pair is that of common sensation. They are to a certain degree necessary to each other.

Scent.—This leads us to the consideration of the term “scent.” It expresses the odour or effluvium which is constantly issuing from every animal, and especially when that animal is in more than usual exercise. In a state of heat or excitement, the pores of the skin appear relaxed, and a fluid or aqueous vapour is secreted, which escapes in small or large quantities, adheres to the persons or substances on which it falls, and is, particularly, received on the olfactory organs. The hound, at almost the earliest period, begins to comprehend the work which he has to perform. The peculiar scent which his nostrils imbibe urges him eagerly to pursue; but the moment he ceases to be conscious of the presence of the effluvium, he is at a perfect loss.

Mr. Daniel, in his work on the Chace, very properly observes, that “the scent most favourable to the hound is when the effluvium, constantly perspired from the game as it runs, is kept by the gravity of the air at the height of his breast. It is then neither above his reach, nor does he need to stoop for it. This is what is meant when the scent is said to be breast-high.”

When the leaves begin to fall, the scent does not lie well in the cover. It frequently alters materially in the same day. This depends principally on the condition of the ground and the temperature of the air, which should be moist but not wet. When the ground is hard and the air dry, there will seldom be much scent. The scent rarely lies with a north or east wind. A southerly wind without rain is the best. Sudden storms are sure to destroy the scent. A fine sunshiny day is not good; but a warm day without sun is always a good one. If, as the morning advances, the drops begin to hang on the bushes, the scent will not lie. During a white frost, the scent lies high, and also when the frost is quite gone; but at the time of its going off the scent never lies. In a hard rain, if the air is mild, the scent will sometimes be very good. A wet night often produces the best chaces. In heathy countries, where the game brushes the grass or the boughs as it goes along, the scent seldom fails. It lies best on the richest soils; but the countries that are favourable to horses are not always so to hounds. The morning usually affords the best scent, and the game is then least able to escape. The want of rest, added perhaps to a full belly, gives the hounds a decided superiority over an early-found fox; and the condition of the ground and the temperature of the air are circumstances of much importance.

Such are the results of the best observations on scent; but, after all, we have much to learn concerning it. Many a day that predicated to be a good one for scent has turned out a very bad one, and *vice versâ*. An old or experienced sportsman,

knowing this, will never presume to make sure of his scent.

We shall be forgiven if we pursue this subject a little at length.

There is not only a constant appropriation of new matter to repair the losses that animals are continually sustaining, but there is a constant elaboration of gaseous or fluid matter maintaining the balance of the different systems, and essential to the continuance of life. This effluvium, as the animal moves from place to place, is attracted and detained for a while by the substances with which it comes into contact, or it remains floating in the atmosphere. There is a peculiar smell or scent belonging to each individual, either generally or under peculiar circumstances.

The sportsman takes advantage of this; and, as most species of dogs possess great acuteness of olfactory power, they can distinguish, or are readily taught to distinguish, not only the scent of the hare from that of the fox, but that of the hare or fox which they are pursuing from that of half a dozen others that may be started during the chase.

The dogs that are selected for this purpose are those the conformation of whose face and head gives ample room for the development of the olfactory apparatus, and these are the different species of hounds; but a systematic education, and too often a great deal of unnecessary cruelty, is resorted to, in order to make them perfect in their work. The distinction between the scent of the fox and that of the hare is soon learned by the respective packs; and, when it is considered that the hunted hare is perspiring at every pore, and her strength being almost exhausted, she is straining every limb to escape from her pursuers, the increasing quantity of vapour which exudes from her will prevent every other newly-started animal from being mistaken for her.

It has been well observed that when the atmosphere is loaded with moisture, and rain is at hand, the gas is speedily dissolved, and mingles with the surrounding air. A storm dissipates it at once, while the cessation of the rain is preceded by the return and increased power of scent. A cold, dry, easterly wind condenses and absorbs it, and this is even more speedily and irretrievably done by superabundant moisture. On fallows and beaten roads the scent rarely lies well, for there is nothing to detain it, and it is swept away in a moment; while over a luxuriant pasture, or by the hedge-row, or on the coppice, it lingers, clinging to the grass or the bushes. In a sunshiny day the scent is seldom strong; for too much of it is evaporated by the heat. The most favourable period is a soft southerly wind without rain, the scent being of the same temperature and gravity with the atmosphere. Although it spreads over the

level, it rises not far above the ground, and, being *breast high*, enables the hound, keeping his muzzle in the midst of it, to run at his greatest speed. The different manners or attitudes in which the dog runs afford pleasing and satisfactory illustrations of the nature of the scent. Sometimes they will be seen galloping with their noses in the air, as if their game had flown away, and an hour or two afterwards every one of them will have his muzzle on the ground. The specific gravity of the atmosphere has changed, and the scent has risen or fallen in proportion.

A westerly wind stands next to a southerly one, for a hunting morning. This is all simple enough, and needs not the mystification with which it has been surrounded. A valuable account of this may be found in Johnson's *Shooting Companion*, a work that is justly and highly approved.

Mr. Delmé Radcliffe has also, in his splendid work on "the noble science," some interesting remarks on the scent of hounds. He says that there is an idiosyncrasy, a peculiarity, in their several dispositions. Some young hounds seem to enter on their work instinctively. From their first to their last appearance in the field they do no wrong. Others, equally good, will take no notice of anything; they will not stoop to any scent during the first season, and are still slack at entering even at the second; but are ultimately distinguished at the head of the pack; and such usually last some seasons longer than the more precocious of the same litter.

THE TONGUE.

The manner of drinking is different in the different animals. The horse, the ox, and the sheep, do not plunge their muzzles into the water, but bring their lips into contact with it and sip it gradually. The dog, whose tongue is longer, plunges it a little way into the fluid, and, curving its tip and its edges, laps, in the language of Johnson, with a "quick reciprocation of the tongue." The horse sucks the water that is placed before him, the dog laps it; and both of them are subject to inflammation of the tongue, to enlargement of that organ, and to a considerable or constant flow of saliva over it.

Extending from the base to the tip of the tongue there is on either side a succession of tendons, which help to retain the tongue in the mouth, and to curve the edge of it, so as to convey the food or the water to the posterior part of the mouth. These all spring from one central cord, and ramify over the membrane of the tongue. On opening the mouth, and keeping it open by means of two pieces of tape, one behind the upper canine teeth, and the other behind the lower ones, and drawing the tongue from the mouth and exposing its under surface, a cuticular fold or ridge will

present itself, occupying a middle line from the base of the tongue to its very point. If this is opened with the lancet, a minute fibrous cord will be exposed through its whole extent. It is the cord which governs the motion of the tongue.

This cord is, sometimes, foolishly and uselessly detached from its adhesions, so far as we can effect it, and drawn forward with a tenaculum and divided. There is one abominable course pursued in effecting this. The violence used in stripping down the tendon is so great, and the lacerated fibrous substance is put so much on the stress, and its natural elasticity is so considerable, that it recoils and assumes the appearance of a dying worm, and the dog is said to have been wormed. For the sake of humanity, as well as to avoid the charge of ignorance, it is to be hoped that this practice will speedily cease.

The Blain.—The blain is a vesicular enlargement on the lateral and under part of the tongue in horses, oxen, and dogs, which, although not of unfrequent occurrence, or peculiarly fatal result, has not been sufficiently noticed by veterinary authors. In the horse and the dog it is often unaccompanied by any previous indisposition, or by other disease; but suddenly there is a copious discharge of saliva, at first limpid and without smell, but soon becoming purulent, bloody, and exceedingly fetid. On examination, the tongue is found apparently enlarged. It is elevated from its base between the maxillary bones, and on the side and towards the base of it are seen large vesicles, pellucid, red, livid, or purple; and, if the discharge is fetid, having near their bases ulcers, irregular, unhealthy, and gangrenous.

In the horse and the dog the progress of the disease is slow, and seldom extends beyond the sides of the tongue. The vesicles are not of such magnitude as to interfere with respiration, and the ulcers are neither many nor foul.

In cattle it is sadly different. The vesicles attain an enormous size. They quickly break and form deep ulcerations, which are immediately succeeded by other vesicles still larger. The whole membrane of the mouth becomes affected; the inflammation and swelling extend to the cellular substance of the neighbouring parts, and the head and neck are considerably, and sometimes enormously enlarged; the respiratory passages are obstructed; the animal breathes with the greatest difficulty, and is, in some cases, literally suffocated.

The primary seat of blain is the cellular substance beneath the integument of the part. As the sublingual glands stretch along the under part of the tongue, and their ducts open on the side of the frænum, it is possible that this disease may

proceed from, or be connected with, obstruction or inflammation of these ducts. Dissection, however, has not proved this; and the seat of the disease, when the swellings are first discovered, is chiefly the cellular tissue between the integument and the lateral parts of the tongue, and also that between the membrane of the mouth and the sublingual glands.

Post-mortem examination shows intense disease: the small intestines are highly inflamed with red and black patches, which are also found in the cæcum, colon, and rectum.

The blain is more frequent in spring and summer than at other seasons of the year. These are the times when the animal is debilitated by the process of moulting, and is then more than usually disposed to inflammatory complaints. It is usually an epidemic disease. Many cases of it occur about the same time in certain districts, and over a great extent of country. When it appears in towns, the country is rarely exempt from it. I am not prepared to say that it is contagious either in the horse or the dog. I have not seen any instance of it. At all events, it is not so virulent in these animals as it is in cattle.

The vesicles should be freely lanced from end to end. There will not, perhaps, be much immediate discharge; for the vesicle will be distended by a substance imperfectly organized, or of such a glassy or inspissated nature as not readily to escape. It will, however, soon disappear; and in four-and-twenty hours, in the majority of cases, the only vestige of the disease will be an incision, not, perhaps, looking very healthy, but that will soon become so and heal. If there have been any previous ulcerations, or the slightest fetor, the mouth should be frequently washed with a diluted solution of the chloride of lime; one part of the saturated solution, and eleven of water. This will act as a powerful and useful stimulus to the foul and indolent ulcer. When all unpleasant smell is removed, the mouth should be bathed with a lotion composed of equal parts of tincture of myrrh and water, or half an ounce of alum dissolved in a quart of water, and two ounces of the tincture of catechu added to the solution. I do not recollect a case in the horse or dog, in which these medicines were not employed with advantage. In cattle, before there has been fetor attending the discharge, or the constitution has been materially affected, these simple means will perfectly succeed.

If the practitioner is consulted somewhat too late, when the constitution has become affected, and typhoid fever has ensued, he should still lance the tumours, and apply the chloride of lime and the tincture of myrrh, and give a gentle aperient. He should endeavour to rouse and support the

system by tonic medicines, as gentian and calumba with ginger, adding to two drachms of the first two and one drachm of the last, half an ounce of nitre; but he should place most dependence on nourishing food. Until the mouth is tolerably sound, it is probable that the animal will not be induced to eat; but it will occasionally sip a little fluid, and therefore gruel should be always within its reach. More should occasionally be given, as thick as it will flow, with a spoon or small horn.

THE LIPS

of the dog discharge, with somewhat less efficiency, the same office as in the horse, cattle, and sheep; and are usefully employed in gathering together the food, and conveying it to the mouth. The lips also secrete the saliva, a fluid that is indispensably necessary for the proper comminution of the food.

Swellings on the inside of the cheek or upper lip, and extending nearly to the angle of the lip, are of frequent occurrence. A superficial sore spreads over it, slightly covered by a yellowish mattery pellicle; and on the teeth, and extending down the gums, there is a deposition of hardened tartarous matter, which is scaled off with a greater or less degree of difficulty. It must be removed, or the sore will rapidly spread over the cheek. A lotion of equal parts of tincture of myrrh and water, with a few drops of the tincture of cantharides, will be usually sufficient to cause the swelling to subside, and the pellicle to be detached. The lip, however, will generally remain slightly thickened. A little soreness will sometimes return, but be easily reduced.

THE TEETH

next claim attention.

According to the dentition of the dog by M. Girard and Linnæus, the following is the acknowledged formula:—

$$\text{Incisors } \frac{6}{6}, \text{ canines } \frac{1-1}{1-1}, \text{ molars } \frac{6-6}{1-1}, = 42.$$

The following cuts exhibit the front teeth of the dog in various stages of growth and decay:

Fig. 1.



Fig. 2.

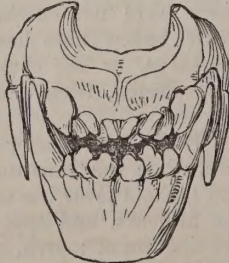


Fig. 3.

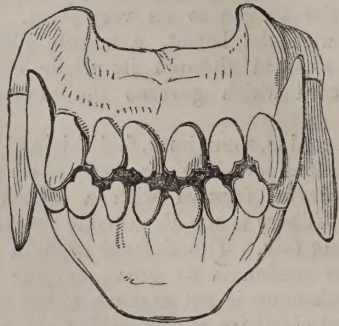


Fig. 4.

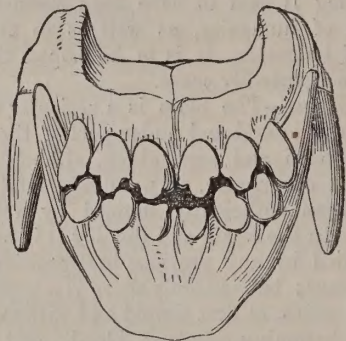


Fig. 5.

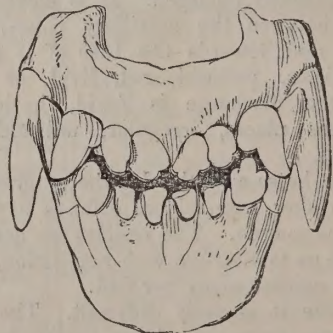


Fig. 6.

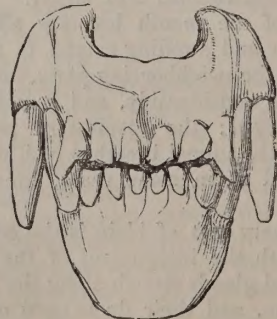
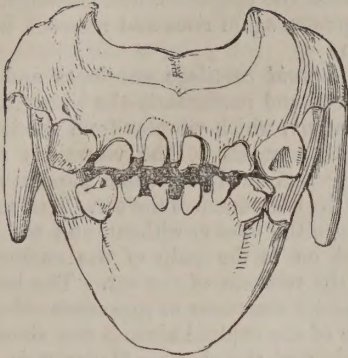


Fig. 7.



The full-grown dog has usually 20 teeth in the upper, and 22 in the lower jaw, with two small supernumerary molars. All of them, with the exception of the tushes, are provided with a bony neck, covered by the gums, and separating the body of the tooth from the root. The projecting portion of the teeth is more or less pointed, and disposed so as to tear and crush the food on which the dog lives. They are of a moderate size when compared with those of other animals, and are subject to little loss of substance compared with the teeth of the horse. In most of them, however, there is some alteration of form and substance, both in the incisors and the tushes; but this depends so much on the kind of food on which the animal lives, and the consequent use of the teeth, that the indication of the age, by the altered appearance of the mouth, is not to be depended upon after the animal is four or five years old. The incisor teeth are six in number in each jaw, and are placed opposite to each other. In the lower jaw, the pincers, or central teeth, are the largest and the strongest; the middle teeth are somewhat less; and the corner teeth the smallest and the weakest. In the upper jaw, however, the corner teeth are much larger than the middle ones; they are farther apart from their neighbours, and they terminate in a conical point curved somewhat inwards and backwards.

As long as the teeth of the full-grown dog are whole, and not injured by use, they have a healthy appearance, and their colour is beautifully white. The surface of the incisors presents, as in the ruminants, an interior and cutting edge, and a hollow or depression within. This edge or border is divided into three lobes, the largest and most projecting forming the summit or point of the tooth. The two lateral lobes have the appearance of notches cut on either side of the principal lobe; and the union of the three resembles the *fleur de lis*, which, however, is in the process of time effaced by the wearing out of the teeth. (figs. 3 & 4.)

While the incisor teeth are young, they are flattened on their sides, and bent somewhat backwards, and there is a decided cavity in which a pulpy substance is enclosed. This, however, is gradually contracted as the age of the dog increases.

M. F. Cuvier speaks of certain supernumerary teeth occasionally developed in each of the jaws. There is much irregularity accompanying them; and they have even been supposed to have extended to seven or eight in number.

The Indications of Age.—The dog displays natural indications of age. The hair turns gray to a certain extent as in the human being. This commences about the eyes, and extends over the face, and weakens the sight; and, at ten years old, or earlier, in the majority of dogs, this can scarcely be mistaken. At fifteen or sixteen years the animal is becoming a nuisance, yet he has been known to linger on until he has reached his two-and-twentieth year.

Among the diseases from which the dog suffers, there are few of more frequent occurrence than decayed teeth, especially in towns, or in the habitations of the higher classes of society: the carious teeth, in almost every case, becoming insufferably fetid, or so loose as to prevent mastication; or an immense accumulation of tartar growing round them.

The course which the veterinary surgeon pursues is an exceedingly simple one. If any of the teeth are considerably loose, they must be removed. If there is any deposit of tartaric acid, it must be got rid of by means of the proper instruments, not very different from those which the human surgeon employs. The teeth must be perfectly cleaned, and every loose one taken away. Without this the dog will be an almost insufferable nuisance.

The decayed and loose teeth being removed, chlorinated lime, diluted with 15 or 20 times its bulk of water, should be applied to the gums. By the use of this the ulcers will quickly heal; the fetor will be removed, and the deposition of the tartar prevented. Mr. Blaine first introduced the chlorinated lime for the accomplishment of these purposes.

Two little histories out of a great number will sufficiently illustrate these cases. A terrier had scarcely eaten during more than a week. He dropped his meat after attempting to chew it, and the breath was very offensive. Several of the teeth were loose, and the rest were thickly encrusted with tartar. The gums had receded from the teeth, and were red, sore, and ulcerated.

I removed all the loose teeth; for experience had taught me that they rarely or never became again fixed. I next, with the forceps and knife, cleaned the others, and ordered the diluted

chlorinated lime to be alternated with tincture of myrrh and water. The extraction of the loose teeth, and the removal of the tartar from those that were sound, occupied a full hour; for the dog resisted with all his might. He, however, soon began to eat; the lotions were continued; and five months afterwards, the mouth of the dog was not in the slightest degree offensive.

An old dog should not be quite abandoned. A pug had only four teeth remaining beside the canines. They were all thickly covered with tartar, and two of them were very loose. The gums and lips were in a dreadfully cankerous state, and the dog was unable to eat. All that he could do was to lap a little milk or broth.

I extracted the two loose teeth, cleaned the others, and ordered a lotion of equal parts of tincture of myrrh and water to be applied.

13th August, 1842.—A very considerable discharge of pus was observed, with blood from the mouth, apparently proceeding from the cavity whence one of the teeth had been extracted. The dog is exceedingly thirsty, and walks round and round the water-dish but is afraid to lap. He has not eaten for two days. Use the lotion as before, and force him with strong soup.

15th. The dog has not voluntarily eaten, but is still forced with soup. He is very costive. Give two grains of calomel and an equal quantity of antimonial powder.

18th. He has eaten a very little, but gets thinner and weaker. Continue the lotion.

27th. The ulcers are nearly healed, and the discharge of pus has ceased.

31st. The mouth is clean, the gums are healed, and there is no longer anything offensive about the dog.

THE LARYNX

is placed at the top of the windpipe, the exit from the lungs, and is also connected with the Schneiderian membrane. At its upper part is the epiglottis, the main guard against the passage of the food into the respiratory tubes, and, at the same time, of the instrument of the voice. It consists of five cartilages united together by a ligamentous substance, and, by distinct and perfect articulations, adapting itself to every change of the respiratory process and the production of the voice.

At the base is the *cricoid cartilage*, the support and bond of union of the rest. Above are the *arytenoid cartilages*, resting on the *cordæ vocales* and influencing their action. The *epiglottis* is placed at the extremity of the opening into the windpipe, with its back opposed to the pharynx, so that when a pellet of food passes from the pharynx in its way to the œsophagus, the epiglottis is applied over the glottis, and by this means closes the aperture of the larynx, and prevents any portion

of the food from passing into it. The food having passed over the epiglottis, that cartilage, from its elastic power, again rises and resumes its former situation.

The *thyroid cartilage* envelopes and protects all the rest, and particularly the lining membrane of the larynx, which vibrates from the impulse of the air that passes. The vibrations spread in every direction until they reach the delicate membrane of the tympanum of the ear. That membrane responds to the motion without, and the vibration is carried on to the pulp of the auditory nerve, deep in the recesses of the ear. The loudness of the tone—its acuteness or graveness—depends on the force of the expired air and the shortening or lengthening of the chord. Hence it is, that the tone of the bark of the dog, or the neighing of the horse, depends so much on the age or size of the animal. Thus we compare the shrill bark of the puppy with the hoarse one of the adult dog; the high-toned but sweet music of the beagle with the fuller and lower cry of the fox-hound, and the deep but melodious baying of the mastiff. I may, perhaps, be permitted to add to these, the whinnying of the colt and the neighing of the horse.

Each animal has his peculiar and intelligible language. He who has long lived among them will recognise the tone of delight at meeting, rising into and terminating in a sharper sound; the strong and elevated tone when they are calling to or challenging each other at a distance; the short expression of anger—the longer, deeper, hoarser tone of fear; the murmur almost as deep, but softer, of habitual attachment, and the elevated yet melodious token of sudden recognition. I could carry on a conversation with a dog that I once possessed for several minutes, and one perfectly intelligible to both.

Inflammation of the larynx is a frequent and dangerous complaint. It usually commences with, and can scarcely be distinguished from, catarrh, except that it is attended by cough more violent and painful, and the dog expectorates considerably. Acute laryngitis is not so frequent an occurrence; but there is much danger attending it. Blood must be abstracted to as great an extent as the pulse will bear, or until it becomes evidently affected. To this must follow digitalis, nitre, tartar emetic, and aloes, and to these must be added a powerful blister. A considerable quantity is effused and organized, the membrane is thickened, perhaps permanently so, and the whole of the submucous cellular tissue becomes œdematous.

The dog is subject to sudden attacks of *angina*. It has been imagined, from the appearances that are manifested, that some strange body is arrested in the windpipe or the throat. There is no dread of water or of the usual fluids; the dog will lap once or twice from that fluid which is placed before

him, and turns slowly away from it; and this circumstance gives rise to what is called dumb madness. The dog barks in a particular manner, or rather howls like a rabid dog: he is out of spirits, has a strange, anxious, altered countenance, and is alternately cold and hot. Frequently added to this is redness of the buccal and nasal membranes. He refuses all solid food, and either will not drink or finds it difficult to swallow anything. His mouth is generally open, and contains a spumy matter exhaling an offensive smell. His tongue, charged with a great quantity of saliva, protrudes from his mouth, and the submaxillary glands are enlarged. To these appearances are added a yellow tint of the eyes, constipation, and a small quantity of urine, surcharged with a deep yellow colour. At this period the disease has generally reached a considerable degree of virulence. Often the inflammation extends to the back part of the mouth and larynx; and in this last case the respiration is attended by a hoarse, hissing kind of sound.

The progress of the disease is rapid, and in a few days it reaches its highest degree of intensity. It is always fatal when it is intense; and, when its influence is widely spread, it is a very dangerous complaint.

Somewhat rarely the subjects of it recover. After death we find great redness and injection in all the affected nervous surfaces, and indications of abscesses in which suppuration was not fully established.

BRONCHOCELE OR GOITRE

in the dog is almost daily forced upon our notice. If a spaniel or pug-puppy is mangy, pot-bellied, ricketty, or deformed, he seldom fails to have some enlargement of the thyroid gland. The spaniel and the pug are most subject to this disease. The jugular vein passes over the thyroid gland; and, as that substance increases, the vein is sometimes brought into sight, and appears between the gland and the integument, fearfully enlarged, varicose, and almost appearing as if it were bursting. The trachea is pressed upon on either side, and the œsophagus by the left gland, and there is difficulty of swallowing. The poor animal pants distressingly after the least exertion, and I have known absolute suffocation ensue. In a few cases ulceration has followed, and the sloughing has been dreadful, yet the gland has still preserved its characteristic structure. Although numerous abscesses have been formed in the lower part of it, and there has been considerable discharge, viscid or purulent, the upper part has remained as hard and almost as scirrhus as before.

Cause of Goitre.—In many cases this enlargement of the thyroid glands is plainly connected with a debilitated state of the constitution generally, and more particularly with a disposition to

rickets. I have rarely seen a puppy that has had mange badly, and especially if mange was closely followed by distemper, that did not soon exhibit goitre. Puppies half-starved, and especially if dirtily kept, are thus affected; and it is generally found connected with a loose skin, flabby muscles, enlarged belly, and great stupidity. On the other hand, I have seen hundreds of dogs, to all appearance otherwise healthy, in whom the glands of the neck have suddenly and frightfully enlarged. I have never been able to trace this disease to any particular food, whether solid or liquid; although it is certainly the frequent result of want of nutriment.

Some friends, of whom I particularly inquired, assured me, that it is not to any great extent prevalent in those parts of Derbyshire where goitre is oftenest seen in the human being.

It is periodical in the dog. I have seen it under medical treatment, and without medical treatment, perfectly disappear for a while, and soon afterwards, without any assignable cause, return. There is a breed of the Blenheim spaniel, in which this periodical goitre is very remarkable; the slightest cold is accompanied by enlargement of the thyroid gland, but the swelling altogether disappears in the course of a fortnight. I am quite assured that it is hereditary; no one that is accustomed to dogs can doubt this for a moment.

Treatment.—I am almost ashamed to confess how many inefficient and cruel methods of treatment I many years ago adopted. I used mercurial friction, external stimulants, and blisters; I have been absurd enough to pass setons through the tumours, and even to extirpate them with the knife. The mercury salivated without any advantage, the stimulants and the blisters aggravated the evil; the setons did so in a tenfold degree, so that many dogs were lost in the irritative fever that was produced; and, although the gland, when dissected out, could not be reproduced, yet I have been puzzled with the complication of vessels around it, and in one case lost my patient by hemorrhage which I could not arrest.

When the power of iodine in the dispersion of glandular tumours was first spoken of, I eagerly tried it for this disease, and was soon satisfied that it was almost a specific. I scarcely recollect a case in which the glands have not very materially diminished; and, in the decided majority of cases, they have been gradually reduced to their natural size. I first tried an ointment composed of the iodide of potassium and lard, with some, but not a satisfactory result. Next I used the tincture of iodine, in doses of from five to ten drops, and with or without any external local application; but I found, at length, that the simple iodine, made into pills with powdered gum and syrup, effected almost all that I could wish. It is best to com-

mence with the eighth of a grain for a small dog, and rapidly increase it to half a grain morning and night. A larger dog may take from a quarter of a grain to a grain. In a few instances, loss of appetite and slight emaciation have been produced; but then, the medicine being suspended for a few days, no permanent ill effect has ever followed the exhibition of iodine.

PHLEGMONOUS TUMOUR.

A phlegmonous tumour under the throat, and accompanied by constitutional disturbance, with the exception of there being little or no cough, often appears in the dog. Comparing the size of the animals, these tumours are much larger than in either the horse or ox; but they are situated higher up the face, and do not press so much upon the windpipe, nor is there any apparent

danger of suffocation from them. The whole head, however, is sometimes enlarged to a frightful degree, and the eyes are completely closed. More than a pint of fluid has sometimes escaped from a middle-sized dog at the first puncture of the tumour.

The mode of treatment is, to stimulate the part, in order to expedite the suppuration of the tumour, and to lance it freely and deeply, as soon as matter is evidently formed. The wound should be dressed with tincture of aloes, and a thick bandage placed round the neck, to prevent the dog from scratching the part, which often causes dreadful laceration.

These tumours in the throat of the dog are not always of a phlegmonous character. They are cysts, sometimes rapidly formed, and of considerable size, and filled with a serous or gelatinous fluid.

CHAPTER XI.

ANATOMY AND DISEASES OF THE CHEST: THE DIAPHRAGM; THE PERICARDIUM; THE HEART; PLEURISY; PNEUMONIA; SPASMODIC COUGH.

THE chest is the superior, or in quadrupeds the anterior, cavity of the trunk of the body: it is divided into two cavities by a membranous partition, termed *mediastinum*; and separated from the abdomen, or cavity which contains the liver, spleen, pancreas, and other abdominal viscera, by the *diaphragm*, which is of a musculo-membranous nature. This membrane may be described, as it is divided, into the main circular muscle, with its central tendinous expansion forming the lower part, and two appendices, or *crura*, as they are termed from their peculiar shape, constituting its superior portion. We trace the fleshy origin of the grand muscle, laterally and inferiorly, commencing from the cartilage of the eighth rib anteriorly, and following somewhat closely, as we proceed backward, the union of the posterior ribs with their cartilages, excepting, however, the two last. The attachment is peculiarly strong. It is denticulated: it encloses the whole of the latter and inferior part of the chest as far as the sternum, where it is connected with the ensiform cartilage.

The diaphragm is the main agent, both in ordinary and extraordinary respiration. In its quiescent state it presents its convex surface towards the thorax, and its concave one towards the abdomen. The anterior convexity abuts upon the lungs; the posterior concavity is occupied by some of the abdominal viscera.

Thus far we have described the diaphragm as found in the horse, ox, and sheep. There is some difference with regard to the dog. The muscular

part of the diaphragm is thick and strong in every species of dog, while the aponeurotic expansion is comparatively smaller. From the smaller expanse of the thorax of the dog, and the consequent little expansion of the diaphragm, the action, although occasionally rapid and violent—for he is an animal of speed—is not so extensive, and more muscle and less tendon may be given to him, not only without detriment, but with evident advantage. Therefore although we have occasional rupture of the heart of the dog, oftener perhaps than in the horse, there is no case of rupture of the diaphragm on record.

The cavity of the thorax is lined by a membrane, termed *pleura*, which covers the surface of the lungs.

The lungs on either side are enclosed in a separate and perfect bag, and each lung has a distinct *pleura*. The heart lies under the left lung; and, more perfectly to cut off all injurious connexion or communication of disease between the lungs and the heart, the heart is enclosed in a distinct *pleura* or bag, termed the *pericardium*. This membrane closely invests the heart, supports it in its situation, prevents too great dilatation when it is gorged with blood, and too violent action when it is sometimes unduly stimulated. Notwithstanding the confinement of the *pericardium*, the heart, when under circumstances of unusual excitation, beats violently against the ribs, and, were it not thus tied down, would often bruise and injure itself, and cause inflammation in the neighbouring parts.

The heart is composed of four cavities; two above, called *auricles* from their shape, and two below, termed *ventricles*, occupying the bulk of the heart. In point of fact, there are two hearts—the one on the left side propelling the blood through the frame, and the other on the right side conveying it through the pulmonary system; but, united in the manner in which they are, their junction contributes to their mutual strength, and both circulations are carried on at the same time.

The beating of the heart in the dog is best examined behind the elbow on the left side. The hand, applied flat against the ribs, will give the number and character of the pulsations. The pericardium or outer investing membrane of the heart, is frequently liable to inflammation, indicated by a quickened and irregular respiration, and an action of the heart, bounding at an early period of the disease, but becoming scarcely recognisable as the fluid increases. The patient is then beginning gradually to sink. A thickening of the substance of the heart is occasionally suspected, and, on the other hand, an increased capacity of the cavities of the heart; the parietes being considerably thinner, and the frame of the animal emaciated.

The pulse of the greater part of our domestic animals has been calculated by Mr. Vatel, in his excellent work on Veterinary Pathology, to be nearly as follows:—

In the horse,	from	32 to	38	pulsations in a minute.
ox or cow,	"	35	42	"
ass,	"	48	54	"
sheep,	"	70	79	"
goat,	"	72	78	"
dog,	"	90	100	"
cat,	"	110	120	"
rabbit,	"	"	120	"
guinea-pig,	"	"	140	"
crow,	"	"	136	"
duck,	"	"	136	"
hen,	"	"	140	"
heron,	"	"	200	"

The pulse of the dog may be easily ascertained by feeling at the heart or the inside of the knee, and it varies materially, according to the breed, as well as the size of the animal. This is very strikingly the case with some of the sporting dogs, with whom the force as well as the rapidity of the pulse vary materially according to the character and breed of the dog.

There is, occasionally, in the dog as in the human being, an alteration of the quantity as well as of the quality, of the blood. *Anæmia* is the term used to designate a deficiency in quantity; *plethora* the opposite state of it. M. D'Arbor relates a very curious account of the former:—

Two dogs were sent into the hospital of the veterinary school at Lyons. They did not appear to suffer any considerable pain. Their skin and

mucous membranes that were visible had a peculiar appearance. They had also comparatively little power over their limbs; so little, indeed, that they rested continually on one side, without the ability to shift their posture. When they were placed on their feet, their limbs gave way, and they fell the moment they were quitted. In despite of the care that was taken of them, they died on the second day.

Incisions were made through the skin, but in opening them no blood flowed. The *venæ cavæ* themselves did not contain any—there were only two clots of blood in the cavities of their hearts. One of them, of the size of a small nutmeg, occupied the left ventricle; the other, which was still smaller, was found at the base of the right ventricle. The chest of one of them enclosed a small quantity of serosity; a similar fluid was between the *dura mater* and the *arachnoid membrane*, and the same was the case in the larger ventricles of the *encephalon*. The other viscera did not offer anything remarkable, except the paleness and flaccidity of their tissue. The great fatigues of the chase, and the immersion of these animals in water at the time that they were very much heated, appeared to have been the causes of this singular disease. In the Report of the labours of the School of Alfort, in the year 1825, the same *anæmia* was remarked in two dogs that died there; one of them had lately undergone a considerable hemorrhage, and in the other *anæmia* had developed itself spontaneously.

It is in fact among dogs that this extreme *anæmia* has been principally observed, and is ordinarily fatal. It has been remarked by M. Crusal in a bullock attacked with *gastro-enteritis*.

This disease, according to M. Vatel, is generally the symptom of a chronic malady, or the instantaneous effect of an excessive hemorrhage. It is rarely primary. The extreme discoloration of the tissues, and of the mucous membrane more particularly; the disappearance of the subcutaneous blood-vessels; and the extreme feebleness of the animal, are the principal symptoms. There also often exists considerable swelling of the limbs.

The following singular case of a wound penetrating into the chest and pericardium of a dog is recorded by Professor Delafond:—

A mastiff dog, fighting with another, was stabbed in the chest by the master of his antagonist. Five hours after the accident the Professor was sent for. On the exterior of the sternum was a laceration an inch and a half in length, covered by a spumy fluid, from the centre of which was heard a gurgling noise, showing that a wound had penetrated into the sac of the pleura. The respiration was quick, and evidently painful; the beating of the heart was also strong and precipi-

tate. The finger being introduced into the wound, penetrated between the fourth and fifth rib on the left side. "Having arrived at the pleuritic sac," says the Professor, "I gently tapped the surface of the lung, in order to assure myself that it was not injured; my finger penetrated into the pericardium, and the point of the heart beat against it."

He bathed the wound with a little diluted wine, and brought the edges of it as near together as he could, and confined them with a suture, administering a mild aperient.

On the following day, the animal walked slowly about, seeking for something to eat; he gave him some milk. On changing the dressing he tried whether he could again introduce any sound into the wound; but it would only penetrate a very little way; indeed reunion by adhesion had already taken place.

On the fifth day the animal was in good spirits; the wound had a healthy red appearance, and all tended to a speedy cure.

On the eighth day he was sent home to his master, a distance of two leagues from his house. He saw the dog eighteen months afterwards, and he was as eager as ever after his game.

The following is a case of rupture of the heart:—A black pointer, of the Scotch breed, had every appearance of good health, except that she frequently fell into a fit after having run a little way, and sometimes even after playing in the yard. She was several times bled during and after these fits. When I examined her, I could plainly perceive considerable and violent spasmodic motion of the heart, and the sounds of the beating of the heart were irregular and convulsive. She was sent to the infirmary, in order to be cured of an attack of mange; but during her stay in the hospital she had these fits several times: the attack almost always followed after she had been playing with other dogs. She appeared as if struck by lightning, and remained motionless for several minutes, her gums losing their natural appearance and assuming a bluish hue. After the lapse of a few minutes she again arose as if nothing had been the matter. She was bled twice in eight days, and several doses of foxglove were administered to her. The fits appeared to become less frequent; but, playing one day with another dog, she fell and expired immediately.

The *post-mortem* examination was made two hours after death. The cavity of the pericardium contained a red clot of blood, which enveloped the whole of the heart; it was thicker in the parts that corresponded with the valve of the heart; and on the left ventricle, and near the base of the left valve of the heart, and on the external part of that viscus, was an irregular rent two inches long. It crossed the wall of the valve of the heart, which

was very thin in this place. The size of the heart was very small considering the height and bulk of the dog. The walls of the ventricles, and particularly of the left ventricle, were very thick. The cavity of the left ventricle was very small; there was evidently a concentric hypertrophy of these ventricles; the left valve of the heart was of great size.

The immediate cause of the rupture of the valve of the heart had evidently been an increase of circulation, brought on by an increase of exercise; but the remote cause consisted in the remarkable thinness of the walls of the valve of the heart. This case is remarkable in more than one respect; first, because examples of rupture of the valve of the heart are very rare; and, secondly, because this rupture had its seat in the left valve of the heart, while, usually, in both the human being and the quadruped, it takes place in the right, and this, without doubt, because the walls and the valves of the right side are thinner.

Diseases of the investing membrane of the lungs, and the pleura of the thoracic cavity, and of the substance of the lungs, are more frequent than those of the heart.

PLEURISY,

or inflammation of the membrane of the chest and the lungs of the dog, is not unfrequent. There are few instances of inflammation of the lungs, or pneumonia, that do not ultimately become connected with or terminate in pleurisy. The tenderness of the sides, the curious twitching that is observed, the obstinate sitting up, and the presence of a short, suppressed, painful cough, which the dog bears with strange impatience, are the symptoms that principally distinguish it from pneumonia. The exploration of the chest by auscultation gives a true picture of it in pleurisy; and, by placing the dog alternately on his chest, his back, or his side, we can readily ascertain the extent to which effusion exists in the thoracic cavity; and, if we think proper, we can get rid of the fluid. It is not a dangerous thing to attempt, although it is very problematical whether much advantage would accrue from the operation. With a favourite dog it may, however, be tried; and, to prevent all accidents, a veterinary surgeon should be intrusted with the case.

PNEUMONIA,

or inflammation of the substance of the lungs, is a complaint of frequent occurrence in the dog, and is singularly marked. The extended head, the protruded tongue, the anxious, bloodshot eye, the painful heaving of the hot breath, the obstinacy with which the animal sits up hour after hour until his feet slip from under him, and the eye closes, and the head droops, through extreme fatigue, yet in a moment being roused again by the feeling of

instant suffocation, are symptoms that cannot be mistaken.

Here, from the comparative thinness of the integument and the parietes, we have the progress of the disease brought completely under our view. The exploration of the chest of the dog by auscultation is a beautiful as well as wonderful thing. It at least exhibits to us the actual state of the lungs, if it does not always enable us to arrest the impending evil.

Mr. Blaine and myself used cordially to agree with regard to the treatment of pneumonia, materially different from the opinions of the majority of sportsmen. Epidemic pneumonia was generally fatal, if it was not speedily arrested in its course. The cure was commenced by bleeding, and that to a considerable extent, when not more than four-and-twenty or six-and-thirty hours had passed; for, after that, the progress of the disease could seldom be arrested. Blistering the chest was sometimes resorted to with advantage; and the cantharides ointment and the oil of turpentine formed one of the most convenient as well as one of the most efficacious blisters. A purgative was administered, composed of mutton broth with Epsom salts or castor oil; to which followed the administration of the best sedatives that we have in those cases, namely, nitre, powdered foxglove, and antimonial powder, in the proportion of a scruple of the first, four grains of the second, and two grains of the third.

Congestion of the lungs is a frequent termination of pneumonia; and in that congestion the air-cells are easily ruptured and filled with blood. That blood assumes a black pulpy appearance, commonly indicated by the term of *rottenness*, an indication or consequence of the violence of the disease, and the hopelessness of the case. A difference consequence of inflammation of the lungs is the formation of tubercles, and, after that, of suppuration and abscess, when, generally speaking, the case is hopeless. A full account of this is given in 'The Horse.'

Two cases of pneumonia will be useful:—

Oct. 22nd, 1820. A black pointer bitch that had been used to a warm kennel, was made to sleep on flat stones without straw. A violent cough followed, under which she had been getting worse and worse for a fortnight. Yesterday I saw her. The breathing was laborious. The bitch was constantly shifting her position, and, whether she lay down or sat up, was endeavouring to elevate her head. Her usual posture was sitting, and she only lay down for a minute. The eyes were surrounded and the nose nearly stopped with mucus. V. S. 3 viij. Emet. Fever-ball twice in the day. 23rd. Breathing not quite so laborious. Will not eat. Medicine as before. Apply a blister on the chest. 24th. Nearly the

same. V. S. 3vj. Bol. utheri. 26th. Decided amendment. She breathes with much less difficulty. Less discharge both from eyes and nose. Bol. utheri. Nov. 7th. Sent home well.

A singular and not uninteresting case came before me. A lady in the country wrote to me to say that her terrier was thin, dull, husking, and perpetually trying to get something from the throat; that her coat stared, and she frequently panted. I replied, that I apprehended she had caught cold; and recommended bleeding to the extent of four ounces, a grain each of calomel and emetic tartar to be given every fourth morning, and a fever-ball, composed of digitalis, nitre, and tartrate of antimony, on each intermediate day.

A few days after this I received another letter from her, saying, that the dog was bled as ordered, and died on the following Thursday. That another veterinary surgeon had been called in, who said that the first one had punctured the *vena cava* in the operation, and that the dog had bled to death internally; and she wished to know my opinion. I replied, that the charge proceeded from ignorance or malice, or both. That in one sense he was right—the jugular, which the other had probably opened, runs into the *vena cava*, and may, with some latitude, be considered a superior branch of it; therefore, thus far the first man had punctured the *vena cava*, which I had done many hundred times; but that the point of union of the four principal veins that form the *vena cava* was too securely seated in the upper part of the thorax for any lancet to reach it. That the rupture of some small arterial vessel might have caused this lingering death, but that the puncture of a vein would either have been speedily fatal, or of no consequence; and that, probably, the animal died of the disease which she had described.

SPASMODIC COUGH

is a troublesome disease to manage. Dogs, and especially those considerably petted, are subject to frequent cough, requiring a material difference in the treatment. Sometimes there is a husky cough, not to so great a degree as in distemper, but followed by the same apparent effort to get something from the throat, the same attempt to vomit, and the ejection of mucus, frothy or adhesive, and occasionally discoloured with bile. It proceeds from irritability or obstruction in some of the air-passages, and oftenest of the superior ones. An emetic will clear the fauces, or at least force out a portion of the adhesive matter which is clogging the bronchial tubes.

A cough of this kind, and attended in its early stages by little fever, seldom requires anything more for its cure than the exhibition of a few gentle emetics, consisting of equal portions of

calomel and emetic tartar, given in doses varying from half a grain to one grain and a half of each.

A harsh hollow cough is attended by more inflammatory action. The depletive system must be adopted here. A loud and harsh cough will yield only to the lancet and to purgatives, assisted by sedative medicines composed of nitre, antimonial powder, and digitalis, or small doses of syrup of poppies, or more minute doses of the hydrocyanic acid; this last medicine, however, should be carefully watched, and only given under surgical advice.

28th October, 1832. A spaniel was apparently well yesterday, but towards evening a violent cough suddenly came on. It was harsh and hollow, and terminated in retching. There was a discharge of water from the eyes; but the nose was cool and moist. Give an emetic, and then two grains of the James's powder. 29th. The animal coughed almost the whole of the night. There was more watery discharge from the eyes, which appeared to be red and impatient of light; the nose continued cool, and the dog did not refuse his food. An aperient ball was given; and twice afterwards in the day, the nitre, antimonial powder, and digitalis. 30th. The cough is as frequent, but not very loud. Give a mixture of syrup of poppies and prussic acid morning and night, and the ball as yesterday. 31st. Nearly in the same state as yesterday, except that he is not so thirsty, and does not eat so well. Give the mixture three times daily. Nov. 1st. He had an emetic in the morning, which produced a large quantity of phlegm, but the cough is no better. No evacuation during the two last days. Give an aperient ball, and the mixture as before in the evening.

The prussic acid has been fairly tried; it has not in the least mitigated the cough, but begins to make the dog sick, and altogether to destroy his appetite. Give three times in the day a mixture consisting of two-thirds of a drachm of syrup of poppies, and one-third of syrup of buckthorn. The sickness ceased, and the cough remained as before. I then gave twice in the day half a grain of calomel, the same of opium, two each of pulvis antimonialis and digitalis, and four grains of nitre, morning and noon, with six grains of the Dover's powder at night. This was continued on the 3rd, 4th, and 5th of November, when there were longer intervals of rest, and the dog did not cough so harshly when the fit was on him. On the 6th, however, no medicine was given; but towards evening the dog coughed as much as ever, and a decided mucous discharge commenced from the nose and the eyes, with considerable snorting. An emetic was given, and the balls resorted to as before.

7th. He appeared to be much relieved by the emetic. The cough was better, the dog ate

well, and had regained his usual spirits. The ball as before. 9th. Slight tenesmus now appeared. It quickly became frequent and violent. The dog strained very much; but the discharge was small in quantity, and consisted of adhesive mucus. Give two drachms of castor oil, and the fever-ball with opium. The cough is worse, and the dog still continues to strain, no blood, however, appearing. 11th. The opium and oil have had their desired effect, and the cough is better. 12th. Except the animal is kept under the influence of opium, the cough is dreadfully troublesome. I have, however, obtained one point. I have been permitted to subtract four ounces of blood; but blood had been mingled with the expectorated mucus before I was permitted to have recourse to the lancet. 13th. The dog is better, and we again have recourse to the fever mixture, to which, on the 14th, I added a very small portion of the carbonate of iron, for the dog was evidently getting weak. The sickness has returned, and the cough is decidedly worse. 16th. Rub a small quantity of rheumatic embrocation, and tincture of cantharides. 17th. The first application of the blister had not much effect; but this morning it began to act. The dog ran about the house as cross as he could be for more than an hour; there was considerable redness on the throat and chest. The cough, however, was decidedly better. 18th. The cough is better. Again apply the embrocation. 19th. The cough and huskiness have returned. Employ an emetic, and continue the embrocation. 20th. The cough is decidedly worse. Continue the embrocation, and give the fever mixture. 23rd. The embrocation and medicine have been daily used; but the cough is as bad as ever. Balls of assafetida, squills, and opium were had recourse to. 25th. The second ball produced the most distressing sickness, but the cough was evidently relieved. The assafetida was discontinued. 28th. The cough, during the last two days, has been gradually getting worse. It is more laborious and longer, and the intervals between it are shorter. Give another emetic and continue the other medicine. 30th. The effect of the emetic was temporary, and the cough is again worse.

Dec. 2nd. Very little change. 5th. The cough appears to be stationary. Again have recourse to the antimony, digitalis, and nitre. 8th. The cough is certainly better. Try once more the assafetida. It again produces sickness, but of a very mild character. 12th. The assafetida was again used morning and night. The cough continues evidently to abate. 14th. The dog coughs very little, not more than half-a-dozen times in the day. Notwithstanding the quantity of medicine that has been taken, the appetite is excellent, and the spirits good. 16th. The cough is still less frequent, but when it occurs it is

attended with retching. 19th. The cough is daily getting better, and is not heard more than three or four times in the four-and-twenty hours, and then very slight. 30th. At length I can say that the cough has ceased. It is seldom that so much trouble would have been taken with a dog. It is the neglect of the medical attendance which is often the cause of death.

Professor Delafond, of Alfort, gives a most interesting and complete table of the usual diagnostic symptoms of pleurisy and pneumonia.

PLEURISY.

Commencement of the Inflammation.—Shivering, usually accompanied by slight colicky pains, and followed by general or partial sweating. Inspiration always short, unequal, and interrupted; expiration full; air expired of the natural temperature. Cough unfrequent, faint, short, and without expectoration. Artery full. Pulse quick, small, and wiry.

Auscultation.—A respiratory murmur, feeble, or accompanied by a slight rubbing through the whole extent of the chest, or in some parts only.

Percussion.—Slight, dead, grating sound. Distinct resonance through the whole of the chest, and pain expressed when the sides are tapped or compressed.

Terminations.—Delitescence. Cessation of pain; moderate temperature of the skin; sometimes profuse general perspiration. Respiration less accelerated; inspiration easier and deeper. Pulse fuller and softer. Breath of the natural temperature. Return of the natural respiratory murmur and resonance. The walls of the chest cease to exhibit increased sensibility.

Effusion, false Membranes.—Inspiration more and more full.

Auscultation and Percussion.—Complete absence of the respiratory murmur, with the crepitating wheezing always at the bottom of the chest; sometimes a gurgling noise. Vesicular

PNEUMONIA.

Commencement of the Inflammation.—General shivering, rarely accompanied by colicky pains, followed by partial sweats at the flanks and the inside of the thighs. Inspiration full, expiration short. Air expired hot. Cough frequently followed by slight discharge of red-coloured mucus. Artery full. Pulse accelerated, strong, full, and soft.

Auscultation.—Absence of respiratory murmur in places where the lung is congested; feebleness of that sound in the inflamed parts, with humid crepitating wheezing. The respiratory murmur increased in the sound parts.

Percussion.—The dead grating sound confined to the inflamed parts. Distinct resonance at the sound parts; increased sensibility of the walls of the chest slight, or not existing at all.

Terminations.—Resolution. Temperature of the skin moderate. Sometimes profuse partial sweats. Laborious respiration subsiding; inspiration less deep. Artery less full. Pulse yielding. Breath less hot. Gradual and progressive disappearance of the crepitating râle. Slow return of the resonance.

Red Hepatization.—Respiration irregular and interrupted.

Auscultation and Percussion.—Circumscribed absence of the respiratory murmur, without any determined place, in one point, or in many distinct parts of the lung. The

PLEURISY.

respiration very strong in the upper region of the chest, or in the sac opposite to the effusion.

Continuance of the Effusion.

—Absence of the respiratory murmur gains the middle region of the chest, following the level of the fluid. These symptoms may be found on only one side; a circumstance of frequent occurrence in the dog, but rare in other animals. The respiratory murmur increases in the superior region of the chest, or on the side opposite to the effusion. Inspiration becomes more and more prolonged. Breath always cold. Cough not existing, or rarely, and always suppressed and interrupted. Exercise producing much difficulty of respiration.

Resolution, or Re-absorption of the effused Fluid, and Organization of false Membrane, the consequence of Pleurisy.—Slow but progressive re-appearance of the respiratory murmur, and disappearance of the sounds produced by the fluid. Diminution of the force of the respiratory murmur in the superior part of the chest, or of the lung opposite to the sac in which the effusion exists. Gradual return of the respiratory murmur to the inferior part of the chest. Inspiration less deep, and returning to its natural state.

Chronic Pleurisy, with Hydrothorax.—Inspiration always deep, expiration short. Cough dry, sometimes with expectoration; frequent or capricious; always absence of complete respiratory murmur in the inferior portion of the chest. Sometimes the gurgling noise during inspiration and expiration. Strong respiratory murmur in the superior portion. In dogs these symptoms sometimes have existence only on one side of the chest. The mucous membranes are infiltrated; serous infiltration on the lower part of the chest and belly; sometimes of the scrotum or the inferior extremities; generally of the fore legs. The animal lies down frequently, and dies of suffocation.

PNEUMONIA.

respiratory murmur increased in one or more of the sound parts of the lungs, or in the sound lung if one is inflamed.

Passage to a State of Gray Induration.—The absence of respiratory murmur indicates extensive hepatization of one lung; a circumstance, however, of rare occurrence. When the induration is of both lungs, and equally so, the respiratory murmur and the inspiration remain the same, except that they become irregular. The cough dry or humid, frequent, and sometimes varying. Exercise accompanied by difficulty of respiration, without dyspnoea.

Resolution, or Re-absorption of the Products of Inflammation of the Parenchymatous Substance of the Lungs.—Diminution of the force of the respiratory murmur in the sound parts. Cessation of the crepitating wheezing. Slow return of the respiratory murmur where it had ceased. Respiration ceases to be irregular or interrupted, and returns slowly to its natural state, or it remains interrupted. This indicates the passage from red to gray induration.

Chronic Pneumonia (Gray Induration).—Inspiration or expiration interrupted. Cough unfrequent; suppressed; rarely with expectoration; always interrupted. Complete absence of respiratory murmur.

(Softening of the Induration, Ulcerations, Vomica, &c.)—Mucous and wheezing; mucous râle in the bronchial; discharge from the nostrils of purulent matter, white, gray, or black, and sometimes fetid. Paleness of the mucous membranes. The animal seldom lies down, and never long at a time. Death by suffocation, when the matter proceeding from the vomica, or abscesses, obstructs the bronchial passages, or by the development of an acute inflammation engrafted upon the chronic one.

CHAPTER XII.

ANATOMY OF THE GULLET, STOMACH, AND INTESTINES; TETANUS; ENTERITIS; PERITONITIS; COLIC; CALCULUS IN THE INTESTINES; INTUSSUSCEPTION; DIARRHŒA; DYSENTERY; COSTIVENESS; DROPSY; THE LIVER; JAUNDICE; THE SPLEEN AND PANCREAS; INFLAMMATION OF THE KIDNEY; CALCULUS; INFLAMMATION OF THE BLADDER; RUPTURE OF THE BLADDER; WORMS; FISTULA IN THE ANUS.

THE *œsophagus*, or gullet, of the dog, is constructed in nearly the same manner as that of the horse. It consists of a similar muscular tube passing down the neck and through the chest, and terminating in the stomach, in which the process of digestion is commenced. The orifice by which the gullet enters the stomach is termed the *cardia*, probably on account of its neighbourhood to the heart or its sympathy with it. It is constantly closed, except when the food is passing through it into the stomach.

The *stomach* has three coats: the outermost, which is the common covering of all the intestines, called the peritoneum; the second or muscular coat, consisting of two layers of fibres, by which a constant motion is communicated to the stomach, mingling the food, and preparing it for digestion; and the mucous or villous, where the work of digestion properly commences, the mouths of numerous little vessels opening upon it, which exude the gastric juice, to mix with the food already softened, and to convert it into a fluid called the chyme. It is a simpler apparatus than in the horse or in cattle. It is occasionally the primary seat of inflammation; and it almost invariably sympathizes with the affections of the other intestines.

The successive contractions of each portion of the stomach, expose by turns every portion of the alimentary mass to the influence of the gastric juice, and each is gradually discharged into the alimentary canal.

As the chyme is formed, it passes out of the other orifice of the stomach, and enters the first intestine or *duodenum*.

It may be naturally supposed that this process will occasionally be interrupted by a variety of circumstances. Inflammation of the stomach of the dog is very difficult to deal with. It is produced by numerous different causes. There is great and long-continued sickness: even the most harmless medicine is not retained on the stomach. The thirst is excessive; there are evident indications of excessive pain, expressed by the countenance and by groans: there is a singular disposition in the animal to hide himself from all observation; an indication that should never be neglected, nor the frequent change from heat to cold, and from cold to heat.

The mode of treatment is simple, although too

often inefficient. The lancet must be immediately resorted to, and the bleeding continued until the animal seems about to fall; and to this should quickly succeed repeated injections. Two or three drops of the croton oil should be injected twice or thrice in the day, until the bowels are thoroughly opened. The animal will be considerably better, or the disease cured, in the course of a couple of days.

There is a singular aptitude in the stomach of the dog to eject a portion of its contents; but, almost immediately afterwards, the food, or a portion if not the whole of it, is swallowed again. This is a matter of daily occurrence. There is a coarse rough grass, the *cynosurus cristatus*, or crested dog's-tail. It is inferior for the purposes of hay, but is admirably suited for permanent pastures. It remains green after most other grasses are burnt by a continuance of dry weather. The dog, if it be in his power, has frequent recourse to it, especially if he lives mostly in a town. The dry and stimulating food, which generally falls to his share, produces an irritation of his stomach, from which he is glad to free himself; and for this purpose he has recourse to the sharp leaves of the *cynosurus*. They irritate the lining membrane of the stomach and intestines, and cause a portion of the food to be occasionally evacuated; acting either as an emetic or a purgative, or both. They seem to be designed by nature to be substituted for the calomel and tartar emetic, and other drugs, which are far too often introduced.

An interesting case of the retention of a sharp instrument in the stomach, is related by Mr. Kent of Bristol.

On the 23rd of February, Mr. Harford, residing in Bristol, when feeding a pointer dog, happened to let the fork tumble with the flesh, and the dog swallowed them both. On the following morning, Mr. Kent was desired to see the animal: and, although he could feel the projection of the fork outwardly, which convinced him that the dog had in reality swallowed it, yet, as he appeared well, and exhibited no particular symptoms of pain or fever, Mr. Kent gave it as his opinion that there was a possibility that he might survive the danger, and the animal was sent to him, in order to be more immediately under his care. The treatment he adopted was, to feed him on cow's liver, with a view to keep the stomach distended and the bowels

open; and he gave him three times a-day half a pint of water, with sufficient sulphuric acid to make it rather strongly sour to the human tongue, with the intention of assisting the stomach in dissolving the iron.

On the following Sunday, the skin at the projecting point began to exhibit some indication of ulceration; and on Monday a prong of the fork might be touched with the point of the finger, when pressed on the ulcer. Mr. Kent then determined on making an effort to extract the fork on the following morning, which he accordingly did, and with but little difficulty, assisted by a medical friend of the owner. The dog was still fed on cow's liver; his appetite remained good, and with very little medical treatment the external wound healed. The animal improved rapidly in flesh during the whole time. He left the infirmary in perfect health, and remained so, with one inconvenience only, a very bad cough, and his being obliged to lie at length, being unable to coil himself up in his usual way.

The fork was a three-pronged one, six and a half inches long. The handle, which was of ivory, was digested; it was quite gone; and either the gastric fluid or the acid, or both conjointly, had made a very apparent impression on the iron.

Dogs occasionally swallow various strange and unnatural substances. Considerable quantities of hair are sometimes accumulated in the stomach. Half-masticated pieces of straw are ejected. Straw mingled with dung is a too convincing proof of rabies. Dog-grass is found irritating the stomach, or in too great quantities to be ejected, while collections of earth and dung sometimes threaten suffocation. Pieces of money are occasionally found, and lead, and sponge. Various species of polypus irritate the coats of the stomach. Portions of chalk, or stone, or condensed matters adhere to each other, and masses of strange consistence and form are collected. The size which they assume increases more and more. M. Galy relates an extraordinary account of a dog. It was about three years old when a tumour began to be perceived in the flank. Some sharp-pointed substance was felt; the veterinary surgeon cut down upon it, and a piece of iron, six inches in length, was drawn out.

The following fact was more extraordinary: it is related by M. Noiret. A hound swallowed a bone, which rested in the superior part of the œsophagus, behind the pharynx, and caused the most violent efforts to get rid of it. The only means by which it could be made to descend into the stomach was by pushing it with the handle of a fork, which, escaping from the hand of the operator, followed the bone into the stomach. Two months afterwards, on examining the stomach, the fork was plainly felt lying in a longitudinal direction, parallel with the position of the body; the

owner of the dog wishing mechanically to accelerate the expulsion of this body, endeavoured to push it backwards with his hands. When it was drawn as far back as possible, he inserted two fingers into the anus, and succeeded in getting hold of the handle, which he drew out nearly an inch; but, in order fully to effect his object, it was necessary to make an incision into the rectum, and free the substance from every obstacle that could retain it. This he did not venture to do, and he was therefore compelled to allow the fork to pass back into its former position.

About three months after the accident, M. Noiret made an incision, three inches from above to below, and the same from the front backwards. He also made an incision through the muscular tissue. Having arrived at the peritoneum, he made another incision, through which he drew from the abdomen a part of the floating portion of the large intestines, and introduced his fingers into the abdominal cavity. He seized the handle of the fork which was among the viscera, and free about half way down, and drew it carefully towards the opening made in the flank. The other half of the fork was found to be closely enveloped by the origin of the mesocolon, which was red, hard, and inflamed. The operator freed it by cutting through the tissues which held the fork, and then drew it easily out. The animal was submitted to a proper course of treatment, and in three weeks afterwards was perfectly cured.

The food having been converted into chyme by the digestive power of the stomach, soon undergoes another and very important change. It, or a portion of it, is converted into chyle. It is mixed with the bile and a secretion from the pancreas in the duodenum. The white thick liquid is separated, and contains the nutritive part of the food, and a yellow pulpy substance is gradually changed into excrement. As these substances pass on, the separation between them becomes more and more complete. The chyle is gradually taken up by the lacteals, and the excrement alone remains.

The next of the small intestines is the *jejunum*, so called from its being generally empty. It is smaller in bulk than the duodenum, and the chyme passes rapidly through it.

Next in the list is the *ileum*; but it is difficult to say where the *jejunum* terminates and the *ileum* commences, except that the latter is usually one-fifth longer than the former.

At the termination of the *ileum* the *cæcum* makes its appearance, with a kind of valvular opening into it, of such a nature that everything that passes along it having reached the blind or closed end must return in order to escape; or rather the office of the *cæcum* is to permit certain alimentary matters and all fluids to pass from the *ileum*, but to oppose their return.

The *colon* is an intestine of very large size, being one of the most capacious, as well as one of the longest, of the large intestines. It commences at the *cæcum caput coli*, and soon expands into a cavity of greater dimensions than even that of the stomach itself. Having attained this singular bulk, it begins to contract, and continues to do so during its course round the *cæcum*, until it has completed its second flexure, where it grows so small as scarcely to exceed in calibre one of the small intestines; and though from about the middle of this turn it again swells out by degrees, it never afterwards acquires its former capaciousness; indeed, previously to its junction with the rectum, it once more materially differs in size.

At the upper part of the margin of the pelvis the colon terminates in the *rectum*, which differs from the *cæcum* and colon by possessing only a partial peritoneal covering, and being destitute of bands and cells. It enlarges towards its posterior extremity, and is furnished with a circular muscle, the sphincter ani; adapted to preserve the anus closed, and to retain the feculent matter until so much of it is accumulated in the rectum as to excite a desire to discharge it.

TETANUS,

a disease of great fatality, often depends upon the condition of the stomach; but it is not frequent in dogs.

Why the dog is so little subject to *tetanus*, or lock-jaw, I am unable to explain. Sportsmen say that it sometimes attacks him when, being heated in the chase, he plunges into the water after the stag. The French give it the name of *mal de cerf*, from stags being supposed to be attacked in a similar way, and from the same cause. In the course of nearly forty years' practice, I have seen but four cases of it. The first arose from a wound in the foot. The cause of the second I could not learn. In both the spasmodic action was dreadful as well as universal. The dogs lay on their sides, the neck and legs stretched out, and the upper legs kept some inches from the ground by the intensity of the spasm. They might be taken up by either leg, and not a portion of the frame change its direction. At the same time, in their countenance, and by their hoarse cries, they indicated the torture which they endured.

In the third case, which occurred 12th June, 1822, the head was drawn permanently on one side, and the whole body formed a kind of bow, the dog walking curiously sideways, often falling as it walked, and frequently screaming violently. I ordered him to be well rubbed with an ammoniacal liniment, and balls of tonic and purging medicine to be given twice in the day. The dog gradually recovered, and was dismissed cured on the 20th.

On the 16th November, in the same year, a bull-terrier had a similar complaint. He had been tried in the pit a fortnight before, and severely injured, and the pain and stiffness of his joints were increasing. The head was now permanently drawn on one side. The dog was unable to stand even for a moment, and the eyes were in a state of spasmodic motion. He was a most savage brute; but I attempted to manage him, and, by the assistance of the owner, contrived to bleed him, and to give him a physic-ball. At the same time I advised that he should be destroyed.

His master would not consent to this; and, as the dog occasionally ate a little, we contrived to give a grain each of calomel and opium every sixth hour. In the course of three days he was materially recovered. He could stand, but was exceedingly weak. I ordered the calomel to be omitted, but the opium to be continued. Three days afterwards he was sent into the country, and, as I heard, perfectly recovered.

The following is a very interesting case of tetanus, detailed by M. Debeaux, of the Royal French Chasseurs:—

A favourite dog was missing. Four days had passed, and no intelligence could be obtained with regard to him until he returned home fatigued and half-starved. He had probably been stolen. In the excess of their joy, the owners crammed him with meat until he became strangely ill. His throat was filled with froth, the pupils of his eyes were dilated, the conjunctiva was strongly injected, his neck was spasmodically contracted, and the spine of the back was bowed, and most highly sensible to the touch. M. Debeaux was sent for; it was an hour before he could attend. The dog was lying on his belly; the four limbs were extended and stiff. He uttered the most dreadful and prolonged howling every two or three minutes. The surgeon ordered the application of a dozen leeches to the chest and belly; laxative medicines were given, and embrocations applied to the spine and back.

Three days passed, and the symptoms evidently augmented. The excrement was dark and fetid, and the conjunctiva had a strong yellow tint. Leeches were again employed; emollient lotions and aperient medicines were resorted to. The sensibility of the spine and back was worse than ever; the animal lay on his belly, stretching out his four limbs, his neck fixed, his jaws immovable, his voice hoarse, and he was utterly unable to move.

The bathings, lotions, and aperients were continued, with very few intermissions, until the 14th day, when the muscles began to be a little relaxed; but he cried whenever he was touched. On the 15th, for the first time, he began to eat a little, and his natural voice returned; still, how-

ever, the spasms occasionally appeared, but very much mitigated, and on the 20th the pain had entirely ceased.

On the 5th of the next month he travelled two leagues with his master. It was cold, and the snow fell. On his reaching home, all the horrible spasms returned, and it was eleven days before he was completely cured.*

Mr. Blaine gives the following account of his experience of this disease:—"It is remarkable, that although dogs are subject to various spasmodic affections, yet they are so little subject to lock-jaw that I never met with more than three cases of it among many thousands of diseased dogs. Two of these cases were *idiopathic*; one being apparently occasioned by exposure to cold air all night; in the other the cause was obscure. The third was of that kind called *sympathetic*, and arose from extreme injury done to one of the feet. In each of these cases the convulsive spasm was extreme, and the rigidity universal but not intense. In one case the jaw was only partially locked. Both warm and cold bathings were tried. Large doses of opium and camphor were given by the mouth, and also thrown up in clysters. The spine of one was blistered. Stimulating frictions were applied to all, but in neither case with any salutary effect."†

ENTERITIS.

Enteritis, or inflammation of the intestines, is a disease to which dogs are very liable. It may be produced by the action of several causes. The intestines of the dog are peculiarly irritable, and subject to take on inflammatory action, and this tendency is often much increased by the artificial life which they lead. It is a very frequent complaint among those dogs that are much petted. A cold temperature is also a common cause of disease in these dogs.

I was consulted with regard to a dog who was hiding himself in a cold, dark corner, paved with stone. Every now and then he lifted his head and uttered a howl closely resembling that of a rabid dog. He fixed his gaze intently upon me, with a peculiarity of expression which many would have mistaken for rabid. They, however, who have had the opportunity of seeing many of these cases will readily perceive the difference. The conjunctiva is not so red, the pupil is not so dilated, and the dog appears to implore pity and not to menace evil.

In this state, if the dog is approached, he will not permit himself to be touched until he be convinced that no harm is intended. A peculiar slowness attends each motion; his cries are fre-

quent and piteous; his belly hot and tender; two cords, in many cases, seem to run longitudinally from the chest to the pubis, and on these he cannot bear the slightest pressure. He abhors all food; but his thirst for water, and particularly cold water, is extreme; he frequently looks round at his flanks, and the lingering gaze is terminated by a cry or groan. In the majority of cases there is considerable costiveness, but in others the bowels are freely opened from the beginning.

The peritoneal inflammation is sometimes pure, but oftener involves the muscular coat of the intestines. Its prevailing cause is exposure to cold, especially after fatigue, or lying on the wet stones or grass. Now and then it is the result of neglected rheumatism, especially in old and petted dogs.

The treatment is simple. Bleed until the pulse falters, put the animal in a warm bath, and let the belly be gently rubbed while the dog is in the water, and well fomented afterwards; the drink should consist of warm broth, or warm milk and water. The bleeding should be repeated, if little or unsatisfactory relief is obtained; and the examination of the rectum with the finger, and the removal of any hardened feces that may have accumulated there, and the cautious use of enemata, neither too stimulating nor too forcibly injected, should be resorted to. No medicine should be employed until the most urgent symptoms are abated. Castor oil, the mildest of our purgatives—syrup of buckthorn assisting the purgative property of the oil, and containing in its composition as much stimulating power as is safe—and the spirit of white poppies—the most convenient anodyne to mingle with the other medicines—will generally be successful in allaying the irritation already existing, and preventing the development of more. Even this must not be given in too large quantities, and the effect must be assisted by a repetition of the enemata every fifth or sixth hour. On examination after death the nature of the disease is sufficiently evident: the peritoneum, or portions of it, is highly injected with blood, the veins are turgid, the muscular membrane corrugated and hardened, while often the mucous membrane displays not a trace of disease. In violent cases, however, the whole of the intestines exhibit evidence of inflammation.

I was much gratified a few years ago in witnessing the decided manner in which Professor Spooner expressed himself with regard to the treatment of enteritis in the dog. "I should deem it advisable," said he, "to administer a purgative; but of what would that consist? Calomel? Certainly not. I was surprised to hear one gentleman assert that he should administer it to the extent of from five to ten grains, and another to say that he should not hesitate to exhibit a scruple

* Tetanus observed on a Dog, by M. Debeaux.—Pract. Méd. Vét. 1829, p. 543.

† Blaine's Canine Pathology, p. 151.

of calomel to a dog, and to all carnivorous animals. I should never think of exhibiting it as a cathartic. I should only administer it in small doses, and for the purpose of producing its specific effect on the liver, which is the peculiar property of this drug. Given in larger doses it would not be retained, and if it got into the intestines it would act as a powerful drastic purgative."*

In our treatment of the horse we have got rid of a great proportion of the destructive urine-balls and drastic purgatives of the farrier. The cow is no longer drenched with half-a-dozen deleterious stimulants. A most desirable change has been effected in the medical treatment of these animals. Let us not, with regard to the dog, continue to pursue the destructive course of the keeper or the huntsman.

The following case of enteritis, with rupture of the colon, may be useful:—

On March 15, 1840, I was requested to attend a large dog of the bull breed, three years old, who had not appeared to be well during the last four or five days.

I had scarcely arrived ere I recognised it to be a case of enteritis. He had a dreadful shivering fit, to which succeeded heat of the skin and restlessness. The muzzle was dry and hot, as also was the tongue. The eyes were sunken and redder than usual; the breathing was accelerated, but not very laborious; the extremities were cold, while the surface of the body was hot and painful to the touch. The bowels were constipated, and had been so during the last week; some dung, however, was evacuated, but it was hard and dry, and in small quantities. The pulse was quick, but full; and there was a slight pain and considerable irritation in the rectum. I took from him $\frac{3}{4}$ x. of blood before the desired effect was produced, and then gave him tinct. opii gr. xiv., et spt. ether. nit. gutt. viij., cum ol. ricini $\frac{3}{4}$ iij., and an opiate enema to allay the irritation of the rectum. This was about 8 o'clock A.M.

11 A.M.—The bowels have not been moved, and the pain is more intense; his countenance expresses great anxiety; he frequently lies on his stomach, and the pulse is small but quick. I gave him a little broth, and ordered the abdomen to be fomented with hot flannels.

2 P.M.—He has had distressing sickness, and is extremely anxious for water. I introduced my finger into the rectum, but could not discover any hardened feces. Enemata, composed of mag-sulphas and warm water, were frequently thrown into the intestines; as soon as one came away another was thrown up.

4 P.M.—No better: gave him pulv. aloes $\frac{3}{4}$ j.; calomel, gr. vj. et pulv. opii gr. viij. The fomen-

tations to be continued, and the abdomen rubbed with a lin. terebinthinæ.

5 P.M.—A great change has taken place within the last hour; the hind extremities are paralyzed; the mouth and ears are cold; the pulse is more hurried and irregular, and almost imperceptible; the respiration is laborious and irregular, as is the pulse; and the dog is frequently sick. To be kept quiet.

6 P.M.—Another change; he lies panting and groaning piteously; his limbs are bathed in sweat, with convulsive struggles. At twenty minutes past six he died.

A post-mortem examination presented general marks of inflammation; the small intestines were extremely red, while the large ones were in a gangrenous state and most offensive, with a rupture of the colon. I did not expect to meet with the rupture, and am at a loss to account for it. The liver was of a pale ashen colour and very light. I put a piece of it into some water and it floated on the surface. The other contents of the abdomen did not show the slightest appearance of disease.

Sept. 2nd, 1843.—A black pug-bitch, eighteen months old, was yesterday taken violently sick; the vomiting continued at intervals the greater part of the day, and she had not eaten during the last twenty-four hours. I could not possibly get at her on account of her ferocity: as she had not had the distemper, and, as I was misled by her age and the watery discharge from her eyes, and, as she had had several motions yesterday, I imagined that the attack might be the beginning of that disease. Learning that she was fond of sweet things, I prepared an emetic containing a grain of calomel and a grain of tartar emetic: she took it readily, and I promised to call on the following day.

Sept. 3. The weakness at the eyes had disappeared, but there had been no motion. On getting at her by main force I found her belly very tense and rather hot; she had again been sick, was very eager for water, and still refused to eat. The disease was now evident. As she appeared too unmanageable for anything else, I produced a physic-ball, in giving which I was bitten.

Six hours afterwards I again went: no feces had passed; I administered two enemas, the second of which was returned with a small quantity of hardened feces and an intolerable smell. I ordered the water to be removed, and broth to be substituted.

Sept. 4. The dog is in good spirits, has eaten heartily, and had no motion, probably because it was habitually cleanly, and had not been taken out of doors. Her owner considered her as quite well, and dismissed me. Three days afterwards a servant came to say that all was going on very well.

PERITONITIS.

Chronic inflammation of the *peritoneal membrane* is a frequent disease among dogs. The ani-

* Proceedings of the Veterinary Medical Association, 1839-40.

mal loses his appetite and spirits: he sometimes eats a little and sometimes not; he becomes thin, his belly is tucked up, and when we closely examine him we find it contracted and hard, and those longitudinal columns of which I have already spoken are peculiarly dense and almost unyielding. He now and then utters a half-suppressed whine, and he occasionally seeks to hide himself. In the greater number of cases he after a while recovers; but he too often pines away and dies. On examination after death the case is plain enough. There is inflammation of the peritoneal membrane, more indicated by undue congestion of the bowels than by the general blush of the membrane. The inflammation has now spread to the muscular coat, and the whole of the intestine is corrugated and thickened.

There is another peritoneal affection, aggravated by combination with a rheumatic tendency, to which the dog is more disposed than any other domesticated animal. It has its most frequent origin in cold, or being too much fed on stimulating and acrid food, and probably from other causes which have not yet been sufficiently developed.

Here also no drastic purgative is to be admitted; it would be adding fuel to fire; not a grain of calomel should be used if the life of the animal is valued. The castor-oil mixture will afford the most certain relief, a drop or two of the oil of peppermint being added to it.

COLIC.

The dog is also subject to fits of *colic*, principally to be traced to improper food, or a sudden change of food, or exposure to cold. This is particularly the case with puppies. There is no redness of the eye, no heat of the mouth, no quickened respiration; but the animal labours under fits of pain. He is not quiet for a minute. He gets into one corner and another, curling himself closely up, but he does not lie there more than a minute or two; another fit of pain comes on; he utters his peculiar yelp, and seeks some new place in which he may possibly find rest.

It is with considerable diffidence that I offer an opinion on this subject contrary to that of Mr. Blaine. He states that the treatment of this species of colic is seldom successful, and that which has seemed the most efficacious has been mercurial purgatives: namely, calomel one grain, aloes a scruple, and opium a quarter of a grain, until the bowels are opened. I have seldom found much difficulty in relieving the patient suffering under this affection; and I gave no aloes nor calomel, but the oleaginous mixture to which I have so often referred. I should not so much object to the aloes, for they constitute an excellent purgative for the dog; nor to a dog that I was preparing for work, or that was suffering from

worms, should I object to two or three grains of calomel intimately mixed with the aloes: from the combined effect of the two some good might be obtained.

CALCULUS IN THE INTESTINES.

Many persons have a very foolish custom of throwing stones, that their dogs may dive or run after them, and bring them to their owner's feet: the consequence is, that their teeth are soon worn down, and there are too many cases on record in which the stone has been swallowed. It has been impeded in its progress through the intestinal canal, inflammation has ensued, and the animal has been lost, after having suffered the most dreadful torture.

Professor Simonds relates a case in which a dog was thus destroyed. The animal for some days previous to his admission into the hospital had refused his food, and there was obstinate constipation of the bowels, to remove which aperient medicine had been given. The pulse was accelerated, there was distention of the abdomen with evident tenderness on pressure, the extremities were cold, no fæces were voided, and he occasionally vomited. Some aperient medicine was given, which was retained on the stomach, and enemas and external stimulants were resorted to, but two days afterwards he died.

The intestines were examined, and the offending body was found to be a common pebble. The dog had long been accustomed to fetch stones out of the water. One of these stones had passed through the stomach into the intestines, and, after proceeding some distance along them, had been impacted there. The inflammation was most intense so far as the stone had gone; but in the part of the intestine to which it had not reached there was no any. This was an interesting and instructive case, and should make its due impression.

Another account of the strange contents of the intestines of a bitch may be here introduced.

A valuable pointer-bitch was sent to the infirmary of Mr. Godwin of Lichfield. She presented a very emaciated appearance, and had done so for four or five months. Her evacuations for a day or two were very thin and copious, and afterwards for several days nothing was passed. When pressing the abdomen with both hands, a hard substance was distinctly felt in the inferior part of the umbilical region. She was destroyed, and, upon *post-mortem* examination, a calculus was discovered in the ilium about the size and shape of a hen's egg, the nucleus of which was a portion of hair. The coats of the intestines were considerably thickened and enlarged, so as to form a kind of sac for its retention. Anterior to this was another substance, consisting of a ball of hair,

covered with a layer of earthy matter about the eighth of an inch thick, and next to this another ball of hair of less dimensions, intermixed with a gritty substance. The stomach contained a large quantity of hair, and a portion of the omentum, about the size of a crown piece, was thickly studded with small white calculi, the largest about the size of a pea, and exceedingly hard.

INTUSSUSCEPTION.

If *peritonitis*—inflammation—is neglected, or drastic purgatives are too often and too plentifully administered, a peculiar contraction of the muscular membrane of the intestine takes place, and one portion of the bowl is received within another—there is *intussusception*. In most cases, a portion of the anterior intestine is received into that which is posterior to it. Few of us have opened a dog that had been labouring under this peculiar affection without being struck with the collapsed state of the canal in various parts, and in some much more than in others. Immediately posterior to this collapsed portion, it is widened to a considerable extent. The peristaltic motion of the intestine goes on, and the consequence is, that the constricted portion is received into that which is widened, the anterior portion is invaginated in the posterior: obstruction of the intestinal passage is the necessary consequence, and the animal dies, either from the general disturbance of the system which ensues, or the inflammation which is set up in the invaginated part.

I will say nothing of medical treatment in this case; for I do not know the symptoms of intussusception, or how it is to be distinguished from acute inflammation of the bowels. Acute inflammation will not long exist without producing it; and, if its existence should be strongly suspected, the treatment would be the same as for inflammation.

The domesticated dog, from the nature of his food, more than from any constitutional tendency, is liable to constipation. This should never be neglected. If two or three days should pass without an evacuation, the case should be taken in hand; otherwise inflammation will be very soon established. In order to procure an evacuation, the aloetic ball, with one or two grains of calomel, should be given. Beyond that, however, I should not dare to go; but, if the constipation continued, I should have recourse to the castor-oil mixture. I should previously examine and empty the rectum, and have frequent recourse to the enema-syringe; and I should continue both. It would be my object to evacuate the intestinal canal with as little increased action as possible.

DIARRHŒA

is the discharge of *faeces* more frequently than usual, and thinner than their natural consistence,

but otherwise not materially altered in quality; and the mucous coat of the intestines being somewhat congested, if not inflamed. It is the consequence of over-feeding, or the use of improper food. Sometimes it is of very short continuance, and disappears without any bad consequence; the health being unaffected, and the character of the *faeces* no otherwise altered than by assuming a fluid character. It may not be bad practice to wait a day, or possibly two, as it is desirable for the action of the intestines to be restored without the aid of art. I should by no means give a physic ball, or a grain of calomel, in simple diarrhœa. I should fear the establishment of that species of purging which is next to be described. The castor-oil mixture usually affords the best hope of success.

Habitual diarrhœa is not an unfrequent disease in petted dogs: in some it is constitutional, in others it is the effect of neglected constipation. A state of chronic inflammation is induced, which has become part of the constitution of the dog; and, if repressed in the intestines, it will appear under a more dangerous form in some other place.

DYSENTERY

is a far more serious complaint. In most cases a considerable degree of inflammation of the mucous coat exists, and the mucus is separated from the membrane beneath, and discharged *per anum*. The mucus thus separated from the intestinal membrane assumes an acrid character. It not only produces inflammation of the membrane, dangerous and difficult to treat, but it excoriates the anus and neighbouring parts, and produces pain and tenesmus.

This disease has sometimes been fatally misunderstood. A great deal of irritation exists in the intestinal membrane generally, and in the lower part of the rectum particularly. The *faeces* passing over this denuded surface causes a considerable degree of pain, and there is much straining, and a very small bit or portion of *faeces* is evacuated. This has often been seen by the careless observer; and, as he has taken it as an indication of costiveness, some drastic purgative has been administered, and the animal quickly killed.

No one that had ascertained the real nature of the disease would administer calomel in any form or combination; but the anodyne mixture as an enema, and also administered by the mouth, is the only medicine from which benefit can be expected.

COSTIVENESS

is a disease when it becomes habitual. It is connected with disease of the intestinal canal. Many dogs have a dry constipated habit, often greatly increased by the bones on which they are too frequently

fed. This favours the disposition to mange and to many diseases depending on morbid secretions. It produces indigestion, encourages worms, blackens the teeth, and causes fetid breath. The food often accumulates in the intestines, and the consequence is inflammation of these organs. A dog should never be suffered to remain costive more than a couple of days. An aloetic ball or some Epsom salts should then be administered; and this failing to produce the desired effect, the castor-oil mixture, with spirits of buckthorn and white poppies, should be administered, and the use of the clyster-pipe resorted to. It may be necessary to introduce the finger or the handle of a spoon when the faecal matter is more than usually hard, and it is with difficulty broken down: small doses of castor oil should be afterwards resorted to, and recourse be occasionally had to boiled liver, which the dog will rarely refuse. The best means, however, of preventing costiveness in dogs, as well as in men, is regular exercise. A dog who is kept chained up in a kennel should be taken out and have a certain quantity of exercise once in the twenty-four hours. When this cannot be done, the food should consist chiefly of well-boiled farinaceous matter.

DROPSY.

Another disease, which is not confined to the abdominal cavity, is dropsy; but as in the dog it most commonly assumes that form which is termed ascites, or dropsy of the abdomen, it may be noticed in this place. It is seldom an idiopathic or primary affection, but is generally the consequence of some other disease, most commonly of an inflammatory kind.

Dropsy is a collection of fluid in some part of the frame, either from increased exhalation, or from diminished absorption, the consequence of inflammation. The divisions of dropsy are into active and passive, or acute and chronic. The causes are also very properly arranged as predisposing and exciting. The diseases on which dropsy most frequently supervenes are fevers and visceral inflammations and obstructions. The dog is peculiarly subject to *ascites* or *dropsy of the belly*, and the quantity of fluid contained in the abdomen is sometimes almost incredible. It is usually accompanied or characterized by a weak, unequal, small, and frequent pulse—paleness of the lips, tongue, and gums—flaccidity of the muscles, hurried breathing on the least exertion, feebleness of the joints, swellings of the lower limbs, effusion of fluid into the integuments or among the muscles, before there is any considerable effusion into the thorax or the abdomen, and an unhealthy appearance of the cutaneous surface. The urine seldom coagulates. This form of dropsy is usually seated in the abdomen or cellular tissue.

The treatment of ascites is seldom perfectly successful. The great extent of the peritoneum, the number and importance of the viscera with which it is connected, and of the absorbent glands which it encloses, the number and weakness of the veins which transmit their blood to the portal vessels, and the absence of valves, in some measure account for the frequent accumulation of fluid in this cavity. It appears in both sexes from the usual causes of inflammatory disease. Unwholesome diet, the drastic operation of purgatives, external injuries, the suppression of accustomed secretions and discharges, all are exciting causes of dropsy.

The animal has suffered materially from mange, which has been apparently cured; the itchiness and eruption altogether disappear, but many weeks do not elapse ere ascites begins to be seen, and the abdomen is gradually distended with fluid. When this appears in young and healthy animals, it may be conquered; but when there has been previous disease of almost any kind, comparatively few patients permanently recover. Irritability of the stomach, and a small and accelerated pulse are unfavourable. If the operation of tapping has taken place, at all times there is danger; but if there is a thick, brown, albuminous, or fetid discharge, it is very unlikely that any permanent advantage will result from the operation.

We will introduce a few cases as they occur in our clinical records.

November 7th, 1821.—A spaniel, nine years old, had been, during four months, alternately asthmatic or mangy, or both. Within the last few days she had apparently increased in size. I was sent for. The first touch of the abdomen betrayed considerable fluctuation. She likewise had piles, sore and swelled. I ordered an alterative ball to be given morning and night. *8th.* One of the balls has been given, and two doses of castor oil; but no effect has been produced. An injection was administered. *9th.* A small evacuation of water has been produced, and the bowels have been slightly opened. Give a dose of the castor-oil mixture. *10th.* The obstruction has been removed; the enlargement is somewhat diminished; much water has passed. Give an alterative ball every morning. *14th.* The alteratives have been continued, and there is a slow but evident decrease of the abdomen. *18th.* I cannot detect any effusion in the abdomen. Give a pill every alternate day for a fortnight. At the expiration of this period the dog was apparently well.

April 23rd, 1822.—A terrier, ten years old, had cough and mange, which ceased. The belly for the first time began to enlarge, and on feeling the dog considerable fluctuation was evident. He would not eat, but he drank immoderately. Give daily a ball consisting of tonic and physic mist.,

with powdered digitalis and tartrate of iron. *May 6th.*—He is in better spirits, feeds tolerably well, but is rather increased in size. Give daily a ball of tartrate of iron, digitalis, ginger, and a grain of calomel. *22nd.* Much thinner, the belly very considerably diminished; a slight fluctuation is still to be perceived. Continue medicine, with a half-grain only of calomel. *July 17th.*—The medicine has been regularly given, and the water of the abdomen has rapidly disappeared, until a fortnight ago: since that time it has been once more filling. The medicine was ordered to be repeated. *August 6th.*—The medicine has once more produced its proper effect, and the fluid has disappeared. On the *16th*, however, the fluctuation was again too plainly felt, and the owner determined to have nothing more to do with the case. The animal was never brought again, nor could I trace it. That dog might have been saved if the owner had done it justice.

As soon as dropsy appears to be established, proper medicines must be resorted to. Foxglove, nitre, and ginger should be first tried in the proportional doses of one, ten, and eight grains, given morning and night. If this does not succeed, iodine, from half a grain to a grain, may be given morning and night, and a weak solution of iodine rubbed on the belly.

This being ineffectual, recourse may be had to tapping, taking care that the trocar is not plunged sufficiently deep to wound the intestines. The place for the operation is directly on the *linea alba*, or middle line of the belly, and about midway between the pubis and the navel. The whole of the intestinal fluid may be suffered to escape. A bandage should then be applied round the belly, and retained there a week or more.

Mr. Blaine very properly states, that the difference between fatness and dropsy is, that the belly hangs pendulous in dropsy, while the back bone stands up, and the hips are protruded through the skin; while the hair is rough, and the feeling of the coat is peculiarly harsh. It may be distinguished from pregnancy by the teats enlarging, in the latter case, as gestation advances, and the young ones may occasionally be felt to move. In addition to this it may be stated, that the presence of water is readily and unerringly detected. If the right hand is laid on one side of the belly, and the other side is gently struck with the left hand, an undulating motion will be readily perceived.

In old dogs, dropsy, under the title of "anasarca," is an unfrequent but occasional accompaniment of ascites. If pressure is made on any particular parts, they yield and continue depressed for a longer or shorter period of time, and slowly and by degrees regain their natural form. The skin is dry and distended, and with no natural action; the circulation is languid and small, the

muscular powers are diminished, the animal is unquiet, the thirst is great, the tongue is pale, the appetite diminished, and the limbs are swelled. The best mode of treatment is the infliction of some very small punctures in the distended skin, and the application of gentle friction. The majority of cases of this kind are usually fatal, and so is almost every case of encysted dropsy.

A dog had cough in February, 1825. Various medicines were administered, and at length the cough almost suddenly ceased, and evident ascites appeared. The thirst was insatiable, the dog would not touch food, and he was unable to lie down more than two minutes at a time. Digitalis, cream of tartar, and hydrarg. submur. were given on the 9th April. On the 13th he was much worse, and apparently dying. He had been unable to rise for the last twelve hours, and lay panting. I punctured the abdomen, and four quarts of fluid were evacuated. *14th.* The panting continues. The dog will not eat, but he can lie down in any posture. *15th.* The panting is diminished, the appetite is returning, and water continues to ooze from the wound. *17th.* The wound healed on the night of the 15th, and already the fluid begins to collect. The medicine still continued. *20th.* The spirits good, and strength improving; but the belly is evidently filling, and matter is discharged from both the nose and eyes. *26th.* The swelling a little diminished, respiration easy, and the dog walking comfortably about, and feeding well. *May 13th.*—The swelling, which for some days past diminished, is now again increasing; but the dog is strong and breathes easily. Medicine as before. *24th.* The dog is thinner, weaker, filling fast, and the thirst excessive. *R* Crem. tart., ferri. tart. 3ij., pulv. flor. anthemid. 3iij. conser. ros. q. s.: divide in bol. xii.: cap. in dies. *27th.* During two days he has been unable to lie down more than a minute at a time. Again tapped: fully as much fluid was evacuated as before; but there is now blood mingling with it. *30th.* Much relieved by the tapping, and breathes with perfect ease; but, now that the enormous belly is reduced, the dog is very thin. Bol. continued. *June 8th.*—Within the last three days the animal has filled again with extraordinary rapidity. *R* Ferr. tart. ʒj., opii. gr. ¼, pulv. gentianæ ʒj., cons. ros. q. s.: f. bol. capiend. in dies. *13th.* Is again strangely distended; I advised, or rather solicited, that it might be destroyed; but this not being granted, I once more tapped him. At least a gallon of dark-coloured fluid evacuated. *22nd.* Again rapidly filling, but not losing either flesh or strength. *July 4th.*—Once more punctured, and a gallon of dark-coloured fluid evacuated. *12th.* Again filling and rapidly losing flesh and strength. *26th.* Once more tapped: immediately after which he

appeared to be revived, but almost immediately began again to fill. *Aug. 2nd.*—He had eaten tolerably; appeared to have nothing more than usual the matter with him, when, being missed for an hour, he was found dead. No examination was permitted.

In 1824 a spaniel, six years old, was brought to the infirmary. It had had an asthmatic cough, which had left it. It was now hollow in the flanks, the belly pendulous, and an evident fluctuation of water. The owner would not consent to any operation. An aloetic physic-ball, however, was given every fifth day, and a ball, composed of tartrate of iron, digitalis, nitre, and antimonial powder, on every intermediate morning and night. The water evidently accumulated; the dog was sent for, and died in the course of a week.

There are a few medicines that may be useful in arresting the effusion of the fluid; but they too often fail in producing any considerable benefit. The fox-glove is, perhaps, possessed of the greatest power, combined with nitre, squills, and bitartrate of potash. At other times chamomile, squills, and spirit of nitrous ether may be tried.

The following case, treated by the administration of iodine, by Professor Dick, is important:—

A black and tan coloured retriever was sent to me labouring under ascites. He was tapped, and two quarts of fluid abstracted. Tonics combined with diuretics were given, but the fluid continued to accumulate, and in three weeks he was again tapped, and another two quarts drawn away. The disease still went on, and a fortnight afterwards a similar quantity was withdrawn. Various remedies were tried in order to check the power of the disease, but without effect, and the abdomen again became as much distended with the effused serum as before.

He was then put under a course of iodine, which soon began to show its beneficial influence, by speedily allaying his excessive thirst; and in about a month the whole of the effused fluid was absorbed, although from the size of the abdomen it must have amounted to a similar quantity to that drawn off on the previous occasions. The dog's appetite soon returned; he gained flesh rapidly, and has continued quite well, and, from being a perfect skeleton, soon became overloaded with fat.

Induced by the great benefit derived in this case from the iodine, I took the opportunity of trying it on a Newfoundland dog similarly affected. He was put on a course of iodine, and the quantity of the drug was gradually increased. As absorption rapidly commenced, the fluid was completely taken up; but partly in consequence of pushing the medicine too far, and partly from extensive disease in the liver, unfavourable symptoms took place, and he sunk rather unexpectedly. Still,

however, from the obvious and decided advantage derived from the medicine, I have no doubt that iodine will be found one of the most efficient remedies in dropsy in dogs.

Iodine is a truly valuable drug. When first introduced into veterinary practice it was observed that it readily accomplished the reduction of the enlarged glands that frequently remain after catarrh; but it was presently evident that it reduced almost every kind of tumour, even the growth of tubercles in the lungs. Professor Morton, in his *Manual of Pharmacy*, has admirably described the different combinations of iodine.

THE LIVER

of the dog seems to follow a law of comparative anatomy, that its bulk shall be in an inverse proportion to that of the lungs. The latter are necessarily capacious; for they need a large supply of arterial blood, in order to answer to their rapid expenditure when the utmost exertion of strength and speed is required. The liver is, therefore, restricted in its size and growth. Nevertheless, it has an important duty to fulfil, namely, to receive the blood that is returned from the intestines, to separate from the blood, or to secrete, by means of it, the bile; and then to transmit the remaining portion of it to the lungs, where it undergoes the usual process of purification, and is changed to arterial blood. In the performance of this office, the liver often undergoes a state of inflammation, and disease ensues, inveterate, and setting at defiance every means of cure. Both the skin and the urine become tinged with a yellow effusion. The animal is dull, and gradually wastes away.

In a few days the yellow hue becomes more intense, and particularly on the cuticle, the conjunctiva, the iris, the gums, and the lips. A state of fever becomes more and more perceptible, and there are alternations of cold and heat. The pulse varies from 80 to 120; the dry tongue hangs from the mouth; the appetite ceases, but the animal is peculiarly desirous of cold water. The dog becomes restless; he seeks to hide himself; and he groans, if the parts in the neighbourhood of the liver are pressed upon.

Frequent vomitings now appear, slimy, and evidently containing gall. The animal becomes visibly thinner, obstinately refuses all solid food, and only manifests thirst. He begins to stagger as he walks; he withdraws himself from observation; he anxiously seeks some dark place where he may lay himself with his chest and belly resting on the cold ground, his fore legs stretched out before him, and his hind legs almost as far behind him. The fever increases, the skin becomes of a dark yellow colour, the mucous membrane of the mouth and conjunctiva is of a dirty red, the ex-

pired air is evidently hot, the gaze is anxious, the urine is of a saffron yellow, or even darker: in short, there now appears every symptom of inflammation of the liver, with jaundice.

As the disease proceeds the animal begins to vomit masses of a yellowish green substance, occasionally mixed with blood. He wastes away to a skeleton, he totters in his walk, he is half unconscious, the pulse becomes weak and interrupted, the temperature sinks, and death ensues.

The duration and course of the disease is deceptive. It occasionally proceeds so insidiously that several days are suffered to pass before the owner perceives any marks of disease, or seeks any aid. The duration of the disease is usually from ten to twelve days. It terminates in congestion of blood in the liver, or a gradual restoration to health. The latter can only take place in cases where the inflammation has proceeded very slowly; where the commencement and progress of the disease could be discovered by debility and slight yellowness of the skin, and especially where speedy recourse has been had to medical aid.

The predisposing causes of this disease are often difficult to discover. The dog, in warm climates, seems to have a natural disposition to it. As exciting causes, atmospheric influence may be reckoned, sultry days, cold nights, and damp weather. Other occasional causes may be found in violent falls, bruises, and over-feeding. Fat petted dogs that are easily overheated by exertion are often attacked by this disease. The result of the disease depends on its duration, course, and complication. If it is attended to early, it can generally be cured. If it has existed for several days, and the fever has taken on a typhoid character—if the yellow hue is perceptible—the appetite failing, and vomiting ensuing, the cure is doubtful; and, if inflammation of the stomach has taken place, with high fever, vomiting of blood, wasting away, and fits occurring, there is no chance of cure.

When simple jaundice alone is visible, a moderate laxative of sulphate of magnesia and tartaric acid, in conjunction with some aromatic and mucilaginous fluid, or, quite in the beginning of the disease, an emetic, will be found of considerable service; but, when the yellow colour has become more intense, and the animal will no longer eat, and the fever and weakness are increased, it is necessary to give calomel, tartar-emetic, camphor, and opium, in the form of pills, and to rub some strong liniment on the region of the liver: the doses of calomel, however, must be very small. If inflammation of the stomach appears, mucilaginous fluids only must be given. Bleeding may be of service in the commencement of the disease, but after it is hurtful.

This is an account of hepatitis as it occasionally appears, and particularly on the Continent;

but it does not often assume so virulent a character in our country. There is often restlessness, thirst, and sickness, accompanied by much prostration of strength; or general heat and tenderness. Occasionally there is purging; but much oftener constipation, that bids defiance to almost every medicine. The principal or almost only hope of cure consists in bleeding, physicking, and blistering on the right side.

Of bilious disease, assuming the character of inflammation, we have too many cases. It may be spontaneous or brought on by the agency of other affections. Long-continued and inveterate mange will produce it. It is often connected with, or produced by, distemper, or a dull inflammatory disease of the liver, and it is generally accompanied by pustular eruption on the belly. The skin is usually tinged of a yellow hue, and the urine is almost invariably impregnated with bile. The suffusion which takes place is recognised among sportsmen by the term "yellows." The remedy should be some mercurial, with gentian and aloes given twice in the day, and mercurial ointment well rubbed in once in the day. If this treatment is steadily pursued, and a slight soreness induced in the mouth, the treatment will usually be successful. Mr. Blaine observes, "A moderate soreness of the mouth is to be encouraged and kept up. I have never succeeded in removing the complaint without it."

JAUNDICE.

M. W. Leblanc, of Paris, has given an interesting account of the causes and treatment of *jaundice* in the dog.

The prevailing symptom of this disease in the dog is a yellow discoloration of the skin and the mucous membranes of greater or less intensity. It generally announces the existence of very serious disease, as inflammation of the liver and its excretory ducts, or of the gall-bladder, or the stomach, or small intestines, or contraction or obliteration of the excretory ducts of the liver, in consequence of inflammation of these vessels, or the presence of concrete substance formed from the bile. The dogs in which he found the most decided traces of this disease laboured under diarrhoea, with stools of a reddish brown or black colour for one, two, or three days.

The causes of jaundice are chiefly over fatigue (thus, greyhounds are more subject to it than pointers), immersions in water, fighting, emetics or purgatives administered in over doses, the repeated use of poisonous substances not sufficiently strong at once to destroy the animal, the swallowing of great quantities of indigestible food, and contusions of the abdominal viscera, especially about the region of the liver. The most serious, if not the most common cause, is cold after violent

and long-continued exercise; and especially when the owners of dogs, seeing them refuse their food after a long chase, give them powerful purgatives or emetics.

The treatment should have strict relation to the real or supposed cause of jaundice, and its most evident concomitant circumstances. Some of these symptoms are constant and others variable. Among the first, whatever be the cause of the disease, we reckon acceleration of the pulse; fever, with paroxysms of occasional intensity; and a yellow or reddish-yellow discoloration of the urine. Among the second are constipation, diarrhœa, the absence or increase of colour in the fæcal matter, whether solid or fluid. When they are solid, they are usually void of much colour; when, on the contrary, there is diarrhœa, the fæces are generally mingled with blood more or less changed. Sometimes the dejections are nearly black, mixed with mucus. It is not unusual for a chest affection to be complicated with the lesions of the digestive organs, which are the cause of jaundice.

With these leading symptoms there are often others connected that are common to many diseases; such as dryness and heat of the mouth, a fetid smell, a staggering gait, roughness of the hair, and particularly of that of the back; an insatiable thirst, accompanied by the refusal of all food; loss of flesh, which occasionally proceeds with astonishing rapidity; a tucked-up flank, with hardness and tenderness of the anterior part of the belly.

The jaundice which is not accompanied with fever, or indeed with any morbid change but the colour of the skin, will require very little treatment. It will usually disappear in a reasonable time, and M. Leblanc has not found that any kind of treatment would hasten that disappearance.

When any new symptom becomes superadded to jaundice, it must be immediately combated. Fever, injection of the vessels of the conjunctiva, constipation, diarrhœa, or the discoloration of the urine, require one bleeding at least, with some mucilaginous drinks. Purgatives are always injurious at the commencement of the disease. "I consider," says M. Leblanc, "this fact to be of the utmost importance. Almost the whole of the dogs that have been brought to me seriously ill with jaundice, have been purged once or more; and either kitchen salt, or tobacco, or jalap, or syrup of buckthorn, or emetic tartar, or some unknown purgative powders, have been administered.

"Bleeding should be resorted to, and repeated if the fever continues, or the animal coughs, or the respiration be accelerated. When the pulse is subdued, and the number of pulsations are below the natural standard—if the excrements are still void of their natural colour—if the con-

stipation continues, or the animal refuses to feed—an ounce of manna dissolved in warm water should be given, and the dog often drenched with linseed tea. If watery diarrhœa should supervene, and the belly is not hot nor tender, a drachm or more, according to the size of the dog, of the sulphate of magnesia or soda should be administered, and this medicine should be repeated if the purging continues; more especially should this aperient be had recourse to when the fæces are more or less bloody, there being no fever nor peculiar tenderness of the belly.

"When the liquid excrement contains much blood, and that blood is of a deep colour, all medicines given by the mouth should be suspended, and frequent injections should be thrown up, consisting of thin starch, with a few drops of laudanum. Too much cold water should not be allowed in this stage of the disease. Injections, and drinks composed of starch and opium, are the means most likely to succeed in the black diarrhœa, which is so frequent and so fatal, and which almost always precedes the fatal termination of all the diseases connected with jaundice.

"In simple cases of jaundice the neutral salts have seldom produced much good effect; but I have obtained considerable success from the diascordium, in doses of half a drachm to a drachm.

"Great care should be taken with regard to the diet of the dog that has had jaundice, with bloody or black diarrhœa; for the cases of relapse are frequent and serious, and almost always caused by improper or too abundant food. A panada of bread, with a little butter, will constitute the best nourishment when the dog begins to recover his appetite. From this he may be gradually permitted to return to his former food. Most especially should the animal not be suffered to take cold, or to be left in a low or damp situation. This attention to the food of the convalescent dog may be thought to be pushed a little too far; but experience has taught me to consider it of the utmost importance, and it is neither expensive nor troublesome."

THE SPLEEN AND PANCREAS.

The spleen is generally regarded as an appendage to the absorbent system. Tidemann and Gmelin consider that its specific function is to secrete from the blood a fluid which possesses the property of coagulation, and which is carried to the thoracic duct, and then, being united with the chyle, converts it into blood, and causes an actual communication between the arterial and absorbent systems. According, however, to Dr. Bostock, there is a fatal objection to this, namely, that animals have been known to live an indefinite length of time after the removal of the spleen, without any obvious injury to their functions, which could not have

been the case if the spleen had been essentially necessary for so important a process.

A knowledge of the diseases of the spleen in the dog appears to be less advanced than in any other animal. In the cases that I have seen, the earliest indications were frequent vomiting, and the discharge of a yellow, frothy mucus. The animal appeared uneasy, shivering, the ears cold, the eyes unnaturally protuberant, the nostrils dilated, the flanks agitated, the respiration accelerated, and the mucous membranes pale. The best treatment I know is the administration, twice in the day, of a ball composed of a grain of calomel and the same quantity of aloes, and five grains of ginger. The dog frequently cries out, both when he is moved and when he lies on his bed. In the course of three days the yellow mucus is generally disappearing, and the expression of pain is materially diminished.

If the bowels are much constipated after two days have passed, two scruples of aloes may be given, and a grain of calomel; frequent injections may also be administered.

We are almost totally ignorant of the functions of the *pancreas*. It probably is concerned in assimilating the food, and converting the chyme of the stomach into chyle.

INFLAMMATION OF THE KIDNEY

is a serious and dangerous malady. This organ is essentially vascular in its texture; and although it is small in volume, yet, on account of the quantity of blood which it contains, and the rapidity with which its secretions are performed, it is disposed to frequent and dangerous inflammation.

The immediate cause of inflammatory action in this viscus are blows and contusions in the lumbar region; hard work long continued, and the imprudent use of stimulating substances employed as aphrodisiacs; the presence of calculi in the kidney, and the arrest of the urine in the bladder. The whole of the kidney may be affected with anæmia or defect of blood, or this may be confined to the cortical substance, or even to the tubular. The kidneys are occasionally much larger than usual, without any other change of structure; or simple hypertrophy may affect but one of them. They are subject to atrophy, which may be either general or partial; or one of the kidneys may be completely wanting, and this evidently the consequence of violence or disease.

Hydatids, although seldom met with in the human kidney, are not unfrequently found in that of the dog. All these are circumstances that have not received sufficient attention.

CALCULOUS CONCRETIONS

are of far more frequent occurrence than is generally imagined, but they are not confined to the kidneys;

there is scarcely a portion of the frame in which they have not been found, particularly in the brain, the glandular substance, and the coats of the intestines.

I cannot say with Mr. Blaine that I have seen not less than 40 or 50 calculi in my museum; but I have seen too many fearful examples of the complaint. There has been usually great difficulty in the urinary evacuation, and at length one of the calculi enters the urethra, and so blocks up the flow of the urine that mortification ensues.

M. Lautour relates a case of renal calculus in a dog. He had occasionally voided his urine with some difficulty, and had walked slowly and with evident pain. August 20, 1827, a sudden exacerbation came on, and the dog was dreadfully agitated. He barked and rolled himself on the ground almost every minute; he made frequent attempts to void his urine, which came from him drop by drop. When compelled to walk, his hind and fore legs seemed to mingle together, and his loins were bent into a perfect curve; his flanks were drawn in; he could scarcely be induced to eat; and he evidently suffered much in voiding his feces. Mild and demulcent liquids were his only food. Warm baths and injections were applied almost unceasingly, and in eight days he seemed to have perfectly gained his health.

In March, in the following year, the symptoms returned with greater intensity. His hind limbs were dragged after him; he rapidly lost flesh, and his howlings were fearful and continuous. The same mode of treatment was adopted without any good effect, and, his cries continuing, he was destroyed.

The stomach and intestines were healthy. The bladder was enlarged from the thickness and induration of its parietes; the mucous membrane of it was covered with ecchymoses; the kidneys were three or four times their natural size; and the pelvis contained a calculus weighing 126 grains, composed of 58 grains of uric acid and 58 of ammonia, with 10 grains of phosphate of lime.

Of the nature and causes of urinary calculi in the bladder we know very little. We only know that some solid body finds its way, or is formed, there, gradually increases in size, and at length partially or entirely occupies the bladder. Boerhaave has given a singular and undeniable proof of this. He introduced a small round pebble into the bladder of a dog. The wound perfectly healed. A few months afterwards the animal was killed, and there was found a calculus of considerable size, of which the pebble was the nucleus.

Occasionally the pressure of the bladder on the calculus which it contains is exceedingly great, so much so, indeed, as to crush the calculus. A small calculus may sometimes be forcibly extracted, or cut down upon and removed; but when the

calculus is large, a catheter or bougie must be passed up the penis as far as the curve in the urethra, and then somewhat firmly held with the left hand, and pressing against the urethra. A scalpel should be taken, and an incision made into the urethra. The catheter being now withdrawn, and the finger or a pair of forceps introduced into the bladder, the calculus may be grasped and extracted.

There are some instances in which as many as 20 or 30 small calculi have been taken from the bladder of a dog. Twice I have seen calculi absolutely crushed in the bladder of a dog; and Mr. Blaine says that he found no fewer than 40 or 50 in the bladder of a Newfoundland dog. One of them had passed out into the urethra, and had so blocked up the passage that the flow of urine was prevented, and the animal died of mortification.

With much pleasure I refer to the details of Mr. Blaine with regard to the management of *vesical calculi*. "When a small calculus," says he, "obstructs the urethra, and can be felt, it may be attempted to be forced forward, through the urethra to the point of the penis, whence it may be extracted by a pair of forceps. If it cannot be so moved, it may be cut down upon and removed with safety; but when one or more stones are within the bladder, we must attempt lithotomy, after having fully satisfied ourselves of their existence there by the introduction of the sound; to do which it must be remembered that the urethra of the dog in passing the bladder proceeds nearly in a direct line backwards, and then, making an acute angle, it passes again forwards to the bladder. It must be therefore evident, that when it becomes necessary to introduce a catheter, sound, or bougie, it must first be passed up the penis to the extremity of this angle; the point of the instrument must then be cut down upon, and from this opening the instrument may be readily passed forward into the bladder. The examination made, and a stone detected, it may, if a very small one, be attempted to be pushed forward by means of a finger passed up the anus into the urethra: but, as this could be practicable only where the dog happened to be a large one, it is most probable that nothing short of the operation of lithotomy would succeed. To this end, the sound being introduced, pass a very small gorget, or otherwise a bistoury, along its groove into the bladder, to effect an opening sufficient to admit of the introduction of a fine pair of forceps, by which the stone may be laid up and extracted."—*Blaine's Canine Pathology*, p. 180.

INFLAMMATION OF THE BLADDER

is of frequent occurrence in the dog; it is also occasionally observed in the horse and the ox. It sometimes appears as an epizootic. It is generally

announced by anxiety, agitation, trembling of the hinder limbs, frequent attempts to urinate, vain efforts to accomplish it, the evacuation small in quantity, sometimes clear and aqueous, and at other times mucous, laden with sediment, thick and bloody, escaping by jets, painfully and with great difficulty, and then suddenly rushing out in great quantity. To this list of symptoms, colic may often be added. The animal drinks with avidity, but seldom eats much, unless at the commencement of the complaint. The skin is hard and dry, he looks at his flanks, and his back and flanks are tender when pressed upon.

During the latter portion of my connexion with Mr. Blaine, this disease assumed an epidemic character. There was a very great drought through almost every part of the country. The disease was characterized by general uneasiness; continual shifting of the posture; a tucked-up appearance; an anxious countenance; a quick and noisy pulse; continued panting; the urine voided in small quantities, sometimes discharged drop by drop, or complete stoppage of it. The belly hot, swelled, and tender to the touch; the dog becoming strangely irritable, and ready to bite even his master.

1st May, 1824.—Two dogs had been making ineffectual attempts to void their urine for nearly two days. The first was a terrier, and the other a Newfoundland. The terrier was bled, placed in a warm bath, and an aloetic ball, with calomel, administered. He was bled a second time in the evening, and a few drops of water were discharged. On the following day, the urine slowly passed involuntarily from him; but when he attempted to void any, his efforts were totally ineffectual. Balls composed of camphor, pulv. uva ursi, tinct. ferri mur., mass purg., and pulv. lini. et gum. arab., were administered morning, noon, and night. On the 5th, the urine still passed involuntarily. Cold lotions were employed, and tonic and astringent medicines administered, with castor oil. He gradually got well, and no trace of the disease remained until June the 6th, when he again became thin and weak, and discharged much bloody urine, but apparently without pain. The uva ursi, oak bark, and powdered gum-arabic were employed. On the 12th he had become much better, and so continued until the 1st of July, when he again exhibited the same complaint more violently than before. He was exceedingly tender on the loins, and screamed when he was touched. He was bled, returned to his uva ursi and powdered gum, and recovered. I saw him two years afterwards apparently well.

The Newfoundland dog exhibited a similar complaint, with nearly the same accompaniments. May 1.—He was disinclined to move; his belly was hard and hot, and he was supposed to be

costive. Gave an aloetic ball with iron. *2nd.* He has endeavoured, in vain, several times to void his urine. He walks stiffly with his back bound. Subtract eight ounces of blood; give another physic-ball, and apply cold affusion to the loins. *3rd.* He frequently attempts to stale, and passes a little urine at each time; he still walks and stands with his back bound. Syr papav. et rhamni, with tinct. ferr. mur., a large spoonful being given morning and night. *4th.* He again tries, ineffectually, to void his urine. Mist. et pulv. *5th.* Unable to void a drop of urine; nose hot; tongue hangs down; pants considerably; will not eat; the countenance has an anxious character. Bleed to twelve ounces; apply cold affusion. Medicine as before, with cold affusion. *6th.* Appears to be in very great pain; not a drop of water has passed from him. Medicine and other treatment as before. In the evening he lay down quietly. On the next morning he was found dead. All the viscera were sound, except the bladder, which was ruptured; the abdomen contained two quarts of bloody fluid. The mucous membrane of the bladder appeared to be in the highest state of inflammation. It was almost black with extravasated blood. On the neck of the bladder was an enlargement of the size of a goose's egg, and almost filling the cavity of the pelvis. On cutting into it more than two ounces of pus escaped.

On June 29, 1833, a poodle was brought to me. He had not been observed to pass any urine for two days. He made frequent attempts to void it, and cried dreadfully. The bladder could be felt distended in the abdomen. I put him into a warm bath, and took from him a pound of blood. He seemed to be a little relieved. I did not leave him until after midnight, but was soon roused by his loud screams, and the dog was also retching violently. The cries and retching gradually abated, and he died. The bladder had burst, and the parietes were in a fearful state of inflammation.

A dog had laboured under incontinence of urine more than two months. The water was continually dropping from him. The servant told me that, three months before, he had been shut into a room two days, and, being a cleanly animal, would not stale until he was liberated. Soon after that the incontinence of urine was observed. I gave the usual tonic balls, with a small portion of opium, night and morning, and ordered cold water to be frequently dashed on the perinæum. A month afterwards he was quite well.

Comparatively speaking, *profuse staling* is not a common disease, except when it is the consequence of bad food, or strong diuretics, or actual inflammation. The cause and the result of the treatment are often obscure. Bleeding, purging, and counter irritation, would be indicated to a cer-

tain extent, but the lowering system must not be carried too far. The medicine would probably be catechu, uva ursi, and opium.

At times blood mingles with the urine, with or without coagulation. The cause and the source of it may or may not be determined. Generally speaking it is the result of some strain or blow.

A terrier bitch, in January, 1820, had incontinence of urine. No swelling or injury could be detected. I used with her the simple tonic balls. *10th January.*—She is now considerably better, and only a few drops are observed. *2nd February.*—The disease, which had seemingly been conquered, began again to re-appear; the medicine had been neglected. Again have recourse to it. *4th March.*—The disease now appears to be quite checked by the cold lotion and the balls.

A CASE OF RUPTURE OF THE BLADDER.

This is a singular account, and stands almost alone.

The patient was a valuable spaniel, belonging to that breed known as "The Duke of Norfolk's," and now possessed in its full perfection by the Earl of Albemarle. Professor Simonds shall give his own account:—I was informed that almost from a puppy to the time when he was two years old, the dog has always been delicate in his appearance, and was observed to void his urine with difficulty; but there were not sufficient indications of disease for the owner to suppose that medical attendance was necessary till within a few days of his death, and then, finding that the act of staling was effected with increased difficulty, and accompanied with extreme pain; that the dog refused his food, was feverish; that at length there were frequent or ineffective efforts to expel the urine, the dog crying out from extremity of pain, and it was sufficiently evident that great mischief was going on, he was placed under my care; and even then he was walked a mile and a half to my infirmary.

My attention was immediately directed to him; the man who brought him informing me that he seemed much easier since he left home. On examination, I at once pronounced that he could not recover; in fact, that he was rapidly sinking; but, from his then state, I could give no opinion with regard to the precise nature or extent of his disease. He was placed upon a bed in an appropriate apartment, with directions not to be disturbed, and in a few hours he died.

The *post-mortem* appearances were the abdomen containing from four to five pints of fluid, having much the character of, but more bloody, than that found in cases of ascites. The peritoneum seemed to be dyed from its immersion in this fluid, as it showed a general red hue, not apparently deeper in some parts than in others. There was an absence,

to a great extent, of that beautiful appearance and well-marked course of the minute blood-vessels which accompany many cases of original peritonitis. Extending the examination, I found the bladder to be ruptured, and that the fluid of which I have spoken was to a large extent composed of urine, mingled with some other secretion from the peritoneal investiture of the abdomen and its viscera, probably produced from the presence of an irritant, the urine being brought into direct contact with the membrane. Farther research showed that this rupture of the bladder was caused in the manner which I have stated. The *post-mortem* examination displayed a chronic enlargement of the prostate gland of a considerable size, causing by its pressure a mechanical obstruction to the passage of the urine. Death in this instance was not immediately brought about by the abnormal state of the original organ affected; but the prostate gland, having early in the life of the animal become diseased, and, being gradually increased in size, became a cause of still more serious disease, attacking more important organs.

WORMS.

There are various kinds of worms to which the dog is subject: they have occasionally been confounded with each other; but they are essentially different in the situations which they occupy, and the effects which they produce.

The *ascarides* are small thread-like worms, generally not more than six or ten lines in length, of a white colour, the head obtuse, and the tail terminating in a transparent prolongation. They are principally found in the rectum. They seem to possess considerable agility; and the itching which they set up is sometimes absolutely intolerable. To relieve this, the dog often drags the fundament along the ground.

All the domesticated animals are subject to the annoyance which these worms occasion. They roll themselves into balls as large as a nut, and become entangled so much with each other that it is difficult to separate them. Sometimes they appear in the stomach, and in such large masses that it is almost impossible to remove them by the act of vomiting. It has been said that packets of *ascarides* have been collected in the stomach containing more than one hundred worms. These collections are rarely or never got entirely rid of. Enormous doses of medicine may be given, and the worms may not be seen again for several weeks; but, at length, they re-appear as numerous as ever.

Young dogs are exceedingly subject to them, and are with great difficulty perfectly freed from their attacks.

Another species of worm is the *teres*. It would resemble the earth-worm in its appearance, were it not white instead of a red colour. They are very

common among dogs, especially young dogs, in whom they are often attended by fits. Occasionally they crawl into the stomach, and there produce a great deal of irritation.

Another, and the most injurious of the intestinal worms, is the *tania*, or *tape-worm*. It is many inches in length, almost flat in the greater part of its extent, and its two extremities are nearly or quite equal. Tape-worms associate in groups like the others, but they are not so numerous; they chiefly frequent the small intestines. They are sometimes apt to coil themselves, and form a mechanical obstruction which is fatal to the dog.

The presence of all these worms is readily detected. There is generally a dry, short cough, a staring coat, a hot and fetid breath, a voracious appetite, and a peculiar state of the bowels, alternately constipated to a great degree, or peculiarly loose and griping. In young dogs the emaciated appearance, stunted growth, fetid breath, and frequent fits, are indications not to be mistaken.

At other times, however, the dog is filled with worms with scarcely any indication of their presence. Mr. Blaine very properly remarks that it does not follow, because no worms are seen to pass away, that there are none; neither, when they are not seen, does it follow even that none pass; for, if they remain long in the intestines after they are dead, they become digested like other animal matter.

The means of expelling or destroying worms in the intestines of the dog are twofold: the first and apparently the most natural mode of proceeding is the administration of purgatives, and usually of drastic ones; but there is much danger connected with this; not merely the *feces* will be expelled, but a greater or less portion of the mucus that lines the intestinal canal. The consequence of this will be griping and inflammation to a very dangerous extent. Frequent doses of Epsom salts have been given; but not always with success, and frequently with griping. Mercurial medicines have been tried; but they have not always succeeded, and have often produced salivation. One method of expelling the worm has been adopted which has rarely failed, without the slightest mischief—the administration of glass finely powdered. Not a particle of it penetrates through the mucus that lines the bowels, while it destroys every intestinal worm. The powdered glass is made into a ball with lard and ginger.

The following account of the symptoms caused by *tania* may be interesting:—A dog used to be cheerful, and particularly fond of his master; but gradually his countenance became haggard, his eyes were red, his throat was continually filled with a frothy spume, and he stalked about with an expression of constant inquietude and suffering. These circumstances naturally excited con-

siderable fear with regard to the nature of his disease, and he was shut up in a court, with the intention of his being destroyed. Thus shut up, he furiously threw himself upon every surrounding object, and tore them with his teeth whenever he could seize them. He retired into one of the corners of the court, and there he was continually rubbing his nose, as it were to extract some foreign body; sometimes he bit and tore up the earth, barking and howling violently; his hair stood on end, and his flanks were hollow.

During the whole of his disease he continued to recognise his master. He ran to him at the slightest word. He refused nothing to drink; but he would not eat. He was killed on account of the fear excited among the neighbours.

The veterinary surgeon who attended him suspected that there was some affection of the head, on account of the strange manner in which he had rubbed and beaten it. The superior part of the nose was opened, and two *tæniæ lanceolatae* were found: it was plain enough that they were the cause of all the mischief.

The proprietor of the dog nevertheless believed that it was a case of rabies; he had the caustic applied to his hands, and could not persuade himself that he was safe until he had been at the baths of Bourbonne.*

There is a worm inhabiting the stomach of young dogs, the *Ascaris Marginata*, a frequent source of sickness, and occasionally of spasmodic colic, by rolling itself into knots. It seems occasionally to take a dislike to its assigned residence, and wanders into the oesophagus, but rarely into the larger intestines. A dog had a severe cough, which could not be subdued by bleeding or physic, or sedative or opiate medicines. He was destroyed, and one of these ascarides was found in the trachea. Others find their way into the nasal cavity; and a dreadful source of irritation they are when they are endeavouring to escape, in order to undergo one of the changes of form to which they are destined, or when they have been forced into the nostril in the act of vomiting.

I once had a dog as a patient whose case, I confess, I did not understand. He would sneeze and snort, and rub his head and nose along the carpet. I happened to say that the symptoms in some respects resembled those of rabies, and yet that I could not satisfy myself that the dog was rabid. The mention of rabies was sufficient, and in defiance of my remonstrances the dog was destroyed.

The previous symptoms led me to examine the nasal cavity, and I found two of these ascarides, one concealed in the middle and the other in the upper meatus, through neither of which

could any strong current of air be forced, and from which the ascarides could not be dislodged.

Worms may be the cause of sudden death in a dog. The following case, communicated by Professor Dick, illustrates this fact:—I lately had the body of a dog sent to me: his owner sent the following letter by the same conveyance:—"My keeper went out shooting yesterday morning with the dog which I now send to you. He was quite lively, and apparently well, during the former part of the day; but towards evening he was seized with violent vomiting. When he came home, he refused to eat, and this morning about eight o'clock he died. As I have lost all my best dogs rather suddenly, I will thank you to have him examined, and the contents of his stomach analyzed; and have the kindness to inform me whether he has been poisoned, or what was the cause of his death."

On opening the abdomen, the viscera appeared quite healthy: the stomach was removed, and the contents were found to be more decidedly acid than usual. The acids were the muriatic and acetic: the finding of an increased quantity of these is far from being unusual. There was not a trace of arsenical, mercurial, nor any other metallic poison present. Of the vegetable poisons, I can only say that there was not the slightest trace of the morbid effects of any of them. The pericardium and the left side of the thorax contained a small quantity of bloody serous fluid, and the heart was full of black blood. The left lung was a little inflamed. The trachea contained some frothy yellow mucous matter, similar to the contents of the stomach. In the larynx was found one of those worms occasionally inhabiting the cavities of the nose, and which had probably escaped from the nose while the dog had been hunting, and, lodging in the larynx, had destroyed the animal by producing spasms of the muscles of the larynx. The worm was about one inch and a half in length, and had partly penetrated through the rima glottidis. Another worm about the same size was found in the left bronchia, and a still smaller one among the mucus of the trachea: there were also four others in the nose.

Several years ago I found some worms of the filaria species in the right ventricle of the heart of a dog, which had produced sudden death by interrupting the action of the valves.

The following is a curious case of tape-worm, by Mr. Reynold:—

On an estate where a great quantity of rabbits are annually destroyed in the month of November, we have observed that several dogs that were previously in good health and condition soon became weak, listless, and excessively emaciated, frequently passing large portions of the tape-worm. This induced us to examine the intestines of

* Prat. Méd. Vét., 1824, p. 214.

several hares and rabbits; and, with very few exceptions, we found each to contain a perfect tape-worm from three to four feet in length. We then caused two of the dogs whose cases appeared the worst to be separated from the others, feeding them on potatoes, &c.; and in eight or ten days, after voiding several feet of the worms, they were perfectly restored to their former strength and appearance. The worm disease, hitherto so formidable to the spaniel and pointer, may in a great measure be fairly attributed to the custom of giving them the intestines of their game, under the technical appellation of "the paunch." The facts above stated, in explaining the cause of the disease, at the same time suggest the remedy.

A worm in the urethra of a dog.—M. Séon, veterinary surgeon of the Lancers of the Body Guard, was requested to examine a dog which strained in vain to void his urine, often uttering dreadful cries, and then eagerly licking his penis. M. Séon, after having tried in vain to abate the irritation, endeavoured to pass an elastic bougie. He perceived a conical body, half an inch long, protruding from the urethra with each effort of

the dog to void his urine, and immediately afterwards returning into the urethra. He crushed it with a pair of forceps, and drew it out. It proved to be a worm resembling a strongylus, four and a half inches long. It was living, and moving about. M. Séon could not ascertain its species. The worm being extracted, the urine flowed, and the dog soon recovered.*

FISTULA IN THE ANUS.

This is a too frequent consequence of piles. It is often the result of the stagnation of hardened feces in the rectum, which produces inflammation and ulceration, and frequently leaves a fistulous opening. If we may judge what the quadruped suffers by the sufferings of human beings, it is a sadly painful affair, whether the fistula is external or internal. Whether it may be cured by a mild stimulant daily inserted, to the bottom of the abscess, or whether there is a communication with the opening of the rectum which buries itself in the cellular tissues around it, and requires an operation for its cure, it will require the assistance of a skilful surgeon to effect a cure in this case.

CHAPTER XIII.

BLEEDING; TORSION; CASTRATION; PARTURITION; AND SOME DISEASES CONNECTED WITH THE ORGANS OF GENERATION.

BLEEDING.

THIS operation is exceedingly useful in many accidents and diseases. It is, in fact, as in the horse, the sheet-anchor of the practitioner in the majority of cases of an inflammatory character. There is some difference, however, in the instrument to be used. The lancet is the preferable instrument in the performance of this operation. The fleam should be banished from among the instruments of the veterinary surgeon.

A ligature being passed round the lower part of the neck, and the head being held up a little on one side, the vein will protrude on either side of the windpipe. It will usually be advisable to cut away a little of the hair over the spot designed to be punctured. When a sufficient quantity of blood is abstracted, it will generally be necessary, and especially if the dog is large, to pass a pin through both edges of the orifice, and secure it with a little tow.

When no lancet is at hand, the inside of the flap of the ear may be punctured with a pen-knife, the course of a vein being selected for this purpose. In somewhat desperate cases a small portion of the tail may be amputated.

The *superficial brachial vein*, the *cephalic vein*

of the human subject, and the *plat* vein of the farrier, may be resorted to in all lamenesses of the fore limb, and especially in all shoulder-wrenches, strains of the loins, and of the thigh and the leg, and muscular and ligamentous extensions of any part of the hind limbs; the *vena saphena major*, and the *anterior tibial vein* may be punctured in such cases.

The quantity of blood to be abstracted must be regulated according to the size and strength of the dog and the degree of inflammation.

One or two ounces may be sufficient for a very small dog, and seven or eight for a large one.

TORSION.

To M. Amusat, of Paris, we are indebted for the introduction of the artery-forceps for the arresting of hemorrhage. I shall do but justice to him by describing his mode of proceeding. He seizes the divided vessel with a pair of torsion-forceps in such a manner as to hold and close the mouth of the vessel in its teeth. The slide of the forceps then shuts its blade, and the artery is held fast. The artery is then drawn from out of

* Prat. Méd. Vét., Fév. 1828.

the tissues surrounding it, to the extent of a few lines, and freed, with another forceps, from its cellular envelope, so as to lay bare its external coat. The index and thumb of the left hand are then applied above the forceps, in order to press back the blood in the vessel. He then begins to twist the artery. One of the methods consists in continuing the torsion until the part held in the forceps is detached. When, however, the operator does not intend to produce that effect, he ceases, after from four to six revolutions of the vessel on its axis for the small arteries, and from eight to twelve for the large ones. The hemorrhage instantly stops. The vessel which had been drawn out is then replaced, as the surrounding parts give support to the knot which has been formed at its extremities. The knot becomes further concealed by the retraction of the artery, and this retraction will be proportionate to the shortening which takes place by the effect of the twisting, so that it will be scarcely visible on the surface of the stump. It is of the utmost importance to seize the artery perfectly, and to make the stated number of twists, as otherwise the security against the danger of consecutive hemorrhage will not be perfect.

Mr. W. B. Costello, of London, was present when the operation was performed at Paris. He brought back a full account of it as performed there, and availed himself of an early opportunity of putting it to the test before some of our metropolitan surgeons. A dog was placed on the table, the forceps were applied, and the operation perfectly succeeded.

A few days afterwards a pointer-bitch was brought to my infirmary, with a large scirrhus tumour near the anterior teat on the left side. It had been gradually increasing during the last five months. It was becoming more irregular in its form, and on one of its tuberculous prominencies was a reddish spot, soft and somewhat tender, indicating that the process of suppuration was about to commence.

I had often, or almost uniformly, experienced the power of iodine in dispersing glandular enlargements in the neck of the dog, and also those indurated tumours of various kinds which form about the joints of some domesticated animals, particularly of cattle; but frequent disappointment had convinced me that it was, if not inert, yet very uncertain in its effect in causing absorption of tumours about the mammæ of the bitch. Having also been taught that the ultimate success of the excision of these enlargements depended on their removal before suppuration had taken place, and the neighbouring parts had been inoculated by the virus which so plentifully flowed from the ulcer, I determined on an immediate operation; and, as the tumour was large, and she was in high condition, I thought it a good case for the *first trial*

of torsion. She was well physicked, and on the third day was produced before my class and properly secured. I had not provided myself with the *torsion-forceps*, but relied on the hold I should have on the vessel by means of a pair of common artery-forceps; and the effect of these imperfect instruments beautifully established the power of torsion in arresting hemorrhage.

Two elliptical incisions were made on the face of the tumour, and prolonged anteriorly and posteriorly about an inch from it. The portion of integument that could be spared was thus enclosed, while the opposed edges of the wound could be neatly and effectually brought together after the operation. The dissection of the integument from the remaining part of the face of the tumour was somewhat slow and difficult, for it was in a manner identified with the hardened mass beneath; but the operation soon proceeded more quickly, and we very soon had the scirrus exposed, and adhering to the thorax by its base. About two ounces of venous blood had now been lost.

I was convinced that I should find the principal artery, by which the excrescence was fed, at its anterior extremity, and not far from the spot where the suppuration seemed to be preparing: therefore, beginning posteriorly, I very rapidly cut through the cellular texture, elevating the tumour and turning it back, until I arrived at the inner and anterior point, and there was the only source of supply; the artery was plainly to be seen. In order to give the experiment a fair chance, I would not enclose it in the forceps, but I cut through it. A jet of blood spirted out. I then seized the vessel as quickly as I could, and began to turn the forceps, but before I could effect more than a turn and a half I lost my hold on the artery. I was vexed, and paused, waiting for the renewed gush of blood that I might seize the vessel again; but to my surprise not a drop more blood came from the arterial trunk. That turn and a half, considerable pressure having been used, had completely arrested the hemorrhage. I can safely say that not more than four drachms of arterial blood were lost.

The wound was sponged clean: there remained only a very slight oozing from two or three points; the flaps were brought together, secured by the ordinary sutures, and the proper bandages applied. The weight of the tumour was twenty-two ounces; there was no after bleeding, no unpleasant occurrences; but the wound, which had been nearly six inches in length, was closed in little more than three weeks.

He will essentially promote the cause of science, and the cause of humanity, who will avail himself of the opportunity which country practice affords of putting the effect of torsion to the test; and few things will be more gratifying than the

consciousness of rescuing our patients from the unnecessary infliction of torture.

In docking, it will be found perfectly practicable: our patients will escape much torture, and tetanus will often be avoided. The principal danger from castration has arisen from the severity with which the iron has been employed. The colt, the sheep, and the dog will be fair subjects for experiment. The cautery, as it regards the first, and the brutal violence too frequently resorted to in operating upon the others, have destroyed thousands of animals.

CASTRATION.

This operation is performed on a great portion of our domestic animals. It renders them more docile, and gives them a disposition to fatten. It is followed by fewest serious accidents when it is performed on young animals. The autumn or spring should, if possible, be chosen for the operation, for the temperature of the atmosphere is then generally uniform and moderate. It should be previously ascertained that the animal is in perfect health; and he should be prepared by a mash diet and bleeding, if he is in a plethoric state, or possessed of considerable determination. If it is a young animal that is to be operated upon, an incision may be made into the scrotum, the testicle may be protruded, and the cord cut without much precaution, for the blood will soon be stayed; but for older animals it will be advisable to use a ligature, applied moderately tightly round the spermatic cord a little more than an inch beyond its insertion into the testicle: the scalpel is then used, and a separation effected between the ligature and the testis. The vas deferens needs not to be included; a great deal of pain will then be spared to the animal.

The ordinary consequences of castration are pain, inflammation, engorgement, and suppuration. The pain and suppuration are inevitable, but generally yield to emollient applications. The engorgement is often considerable at first, but soon subsides, and the suppuration usually abates in the course of a few days. It has been said that the castrated dog is more attached and faithful to his master than he who has not been deprived of his genital powers; this, however, is much to be doubted. He has, generally speaking, lost a considerable portion of his courage, his energy, and his strength. He is apt to become idle, and is disposed to accumulate fat more rapidly. His power of scent is also very considerably diminished, and he is less qualified for the sports of the field. Of this there can be no doubt. It has been said that he is more submissive: I very much doubt the accuracy of that opinion. He may not be so savage as in his perfect state; he may not be so eager in his feeding; but there is not the devotion

to his master, and the quickness of comprehension which belongs to the perfect dog.

The removal of the ovaries, or spaying of the female, used to be often practised, and packs of spayed bitches were, and still are, occasionally kept. In performing this operation, an opening is made into the flank on one side, and the finger introduced—one of the ovaries is laid hold of and drawn a little out of the belly; a ligature is then applied round it, just above the bifurcation of the womb, and it is cut through, the end of the ligature being left hanging out of the wound. The other ovary is then felt for and drawn out, and excised and secured by a ligature. The wound is then sewed up, and a bandage is placed over the incision. Some farriers do not apply any ligature, but simply sew up the wound, and in the majority of cases the edges adhere, and no harm comes of the operation, except that the general character of the animal is essentially changed. She accumulates a vast quantity of fat, becomes listless and idle, and is almost invariably short-lived.

The female dog, therefore, should always be allowed to breed. Breeding is a necessary process; and the female prevented from it is sure to be affected with disease sooner or later; enormous collections and indurations will form that will inevitably terminate in scirrhus or ulceration.

A troublesome process often occurs when the female is not permitted to have young ones, namely, the accumulation of milk in the teats, especially if at any previous time, however distant, she may have had puppies once. The foundation is laid for many unpleasant and unmanageable complaints. If she is suffered to bring up one litter after another, she will have better health than those that are debarred from intercourse with the male.

The temporary union which takes place between the male and female at the period at which they are brought together is a very singular one. The corpora cavernosa of the male and the clitoris of the female being suddenly distended with blood, it is impossible to withdraw either of them until the turgescence of the parts has entirely ceased.

PARTURITION.

The pupping usually takes place from the sixty-second to the sixty-fourth day; and the process having commenced, from a quarter to three-quarters of an hour generally takes place between the production of each puppy.

Great numbers of bitches are lost every year in the act of parturition; there seems to be a propensity in the females to associate with dogs larger than themselves, and they pay for it with their lives. The most neglected circumstance during the period of pregnancy is the little exer-

cise which the mother is permitted to take, while, in point of fact, nothing tends more to safe and easy parturition than her being permitted or compelled to take a fair quantity of exercise.

When the time of parturition has arrived, and there is evident difficulty in producing the foetus, recourse should be had to the ergot of rye, which should be given every hour or half-hour, according to circumstances. If after a certain time, some, although little, progress has been made, the ergot must be continued in smaller doses, or perhaps suspended for a while; but, if all progress is evidently suspended, recourse must be had to the hook or the forceps. By gentle but continued manipulation much may be done, especially when the muzzle of the puppy can be brought into the passage. As little force as possible must be used, and especially the foetus little broken. Many a valuable animal is destroyed by the undue application of force.

If the animal seems to be losing strength, a small quantity of laudanum and ether may be administered. "The patience of bitches in labour is extreme," says Mr. Blaine; "and their distress, if not removed, is most striking and affecting. Their look is at such time particularly expressive and apparently imploring." When the pupping is protracted, and the young ones are evidently dead, the mother may be saved, if none of the puppies have been broken. In process of time the different puppies may, one after another, be extracted; but when violence has been used at the commencement, or almost at any part of the process, death will assuredly follow.

June 15, 1832.—A spaniel bitch was brought to my infirmary to-day, who has been in great and constant pain since yesterday, making repeated but fruitless efforts to expel her puppies. She is in a very plethoric habit of body; her bowels are much confined, and she exhibits some general symptoms of febrile derangement, arising, doubtless, from her protracted labour. This is her first litter. Upon examination, no young could be distinctly felt.

Place her in a warm bath, and give her a dose of castor oil, morning and evening.

June 16.—The bitch appears in the same state as yesterday, except that the medicine has operated freely upon the bowels, and the febrile symptoms have somewhat decreased. Her strainings are as frequent and distressing as ever. Take two scruples of the ergot of rye, and divide into six doses, of which let one be given every half-hour.

In about ten minutes after the exhibition of the last dose of this medicine, she brought forth, with great difficulty, one dead puppy; upon taking which away from her, she became so uneasy that I was induced to return it to her. In about a

quarter of an hour after this I paid her another visit: the puppy could not now be found; but a suspicious appearance in the mother's eye betrayed at once that she had devoured it. I immediately administered an emetic, and in a very short time the whole foetus was returned in five distinct parts, viz., the four quarters and the head. After this, the bitch began to amend very fast; she produced no other puppy, and as her supply of milk was small, she was soon convalescent.

Twelve months afterwards she was again taken in labour, about eleven o'clock in the morning, and after very great difficulty, one puppy was produced. After this the bitch appeared in great pain, but did not succeed in expelling another foetus, in consequence of which I was sent for about three o'clock P.M. I found her very uneasy, breathing laboriously; the mouth hot, and the bowels costive; but I could not discover any trace of another foetus. She was put into a warm bath, and a dose of opening medicine was administered.

About five o'clock she got rid of one dead and two living puppies.

2nd. She is still very ill; she evinces great pain when pressed upon the abdomen; and it is manifest that she has another foetus within her. I ordered a dose of the ergot, and in about twenty minutes a large puppy was produced nearly dying. She survived with due care.

I cannot refrain from inserting the following case at considerable length:—

Sept. 4, 1820.—A very diminutive terrier, weighing not 5 lbs., was sent to my hospital in order to lie in. She was already restless and panting. About eight o'clock at night the labour pains commenced; but until eleven scarcely any progress was made. The *os uteri* would not admit my finger although I frequently attempted it.

At half-past eleven, the membranes began to protrude; at one the head had descended into the pelvis and the puppy was dead. In a previous labour she had been unable to produce her young, although the ergot of rye had been freely used. I was obliged to use considerable force, and she fought terribly with me throughout the whole process. At half-past one, and after applying considerable force, I brought away a large foetus, compared with her own size. On passing my finger as high as possible, I felt another foetus living, but the night passed and the whole of the following day, and she ate and drank, and did not appear to be much injured.

Several times in the day I gave her some strong soup and the ergot. Some slight pains now returned, and by pressing on the belly the nose of the foetus was brought to the superior edge of the pelvis. The pains again ceased, the pudenda began to swell from frequent examination, the bitch began to stagger, and made frequent attempts

to void her urine: with extreme difficulty in accomplishing it. I now resorted to the crotchet; and after many unsuccessful attempts, in which the superior part of the vagina must have been considerably bruised, I fixed it sufficiently firmly to draw the head into the cavity of the pelvis. Here for a while the shoulder resisted every attempt which I could make without the danger of detruncating the foetus. At length, by working at the side of the head until my nails were soft and my fingers sore, I extracted one fore leg. The other was soon brought down; another large puppy was produced, but destroyed by the means necessary for its production. This was the fruit of two hours' hard work.

She was completely exhausted, and scarcely able to stand. When placed on the ground she staggered and fell at almost every step. Her efforts to void her urine were frequent and ineffectual.

At four o'clock I again examined her; the external pudenda were sore and swelled, and beginning to assume a black hue. It was with considerable difficulty that I could introduce my finger. A third foetus irregularly presented was detected. I could just feel one of the hind legs. No time was to be lost. I introduced a small pair of forceps by the side of my finger, and succeeded in laying hold of the leg without much difficulty, and, with two or three weak efforts from the mother,—I could scarcely call them pains,—I brought the leg down until it was in the cavity of the pelvis. I solicited it forward with my finger, and, by forcibly pressing back the *labia pudendi*, I could just grasp it with the finger and thumb of the right hand. Holding it there, I introduced the finger of the right hand, and continued to get down the other leg, and then found little difficulty until the head was brought to the superior edge of the pelvis. After a long interval, and with considerable force, this was brought into the pelvis, and another puppy extracted. This fully occupied two hours.

The bitch now appeared almost lifeless. As she was unable to stand, and seemed unconscious of every thing around her, I concluded that she was lost: I gave her one or two drops of warm brandy and water, covered her up closely, and put her to bed.

To my surprise, on the following morning, she was curled round in her basket; she licked my hands, and ate a bit of bread and butter; but when put on her legs staggered and fell. The pudendum was dreadfully swollen, and literally black. In the afternoon she again took a little food: she came voluntarily from her basket, wagged her tail when spoken to, and on the following day she was taken in her basket a journey of 70 miles, and afterwards did well; no one could be more rejoiced

than was her master, who was present at, and superintended the greater part of the proceedings.

The beneficial effect of Ergot of Rye in difficult Parturition.—The following case is from the pen of Professor Dick:—On the 10th instant, a pointer bitch produced two puppies; and it was thought by the person having her in charge that she had no more. She was put into a comfortable box, and with a little care was expected to do well. On the next morning, however, she was sick and breathed heavily, and continued rather uneasy all the day.

On the forenoon of the following day I was requested to see her. I found her with her nose dry, breath hot, respiration frequent, mouth hot and parched, coat staring, back roached, pulse 120, and a black fetid discharge from the vagina. Pressure on the abdomen gave pain. A pup could be obscurely felt; the secretion of milk was suppressed, and the skin had lost its natural elasticity.

Tepid water with a little soap dissolved in it was immediately injected into the uterus, which in a considerable degree excited its action; and this injection was repeated two or three times with the same effect.

After waiting for half an hour, the foetus was not discharged nor brought forward; therefore a scruple of the ergot of rye was then made into an infusion with two ounces of water, and one-third of it given as a dose; in half an hour another one-third of it; the injections of warm water and soap being also continued. Soon after the second dose of the infusion, a dead puppy was expelled; the bitch rapidly recovered, and, with the exception of deficiency of milk, is now quite well.

This case would seem to prove the great power of the ergot of rye over the uterus; but, until more experiments are made, it is necessary to be cautious in ascribing powers to medicines which have not been much tried in our practice. It is not improbable that the warm water and soap might have roused the uterus into action without the aid of the ergot; and it is therefore necessary that those who repeat this experiment should try the effects of the medicine unaided by the auxiliary.

The Professor adds, that the great power which this drug is said to have on the human being, and the apparent effect in the case just given, suggest the propriety of instituting a further trial of it, and of our extending our observations to cattle, amongst which difficult cases of calving so frequently occur.

Mr. Simpson thus concludes some remarks on ergot in difficult parturition. This medicine possesses a very great power over the uterus, rousing its dormant or debilitated contractility, and stimulating it to an extra performance of this necessary

function after its natural energy has been in some measure destroyed by forcible but useless action. The direct utility of the ergot was manifested in cases where the uterus appeared quite exhausted by its repeated efforts; and certainly it is but fair to ascribe the decidedly augmented power of the organ to the stimulus of the ergot, for no other means were resorted to in order to procure the desired effect. Its action, too, is prompt. Within ten minutes of the administration of a second or third dose, when nature has been nearly exhausted, the parturition has been safely effected.

Puerperal Fits.—Nature proportions the power and resources of the mother to the wants of her offspring. In her wild undomesticated state she is able to suckle her progeny to the full time; but, in the artificial state in which we have placed her, we shorten the interval between each period of parturition, we increase the number of her young ones at each birth, we diminish her natural powers of affording them nutriment, and we give her a degree of irritability which renders her whole system liable to be excited and deranged by causes that would otherwise be harmless; therefore it happens that, when the petted bitch is permitted to suckle the whole of her litter, her supply of nutriment soon becomes exhausted, and the continued drain upon her produces a great degree of irritability. She gets rapidly thin; she staggers, is half unconscious, neglects her puppies, and suddenly falls into a fit of a very peculiar character. It begins with, and is sometimes confined to, the respiratory apparatus; she lies on her side and pants violently, and the sound of her laboured breathing may be heard at the distance of twenty yards. Sometimes spasms steal over her limbs; at other times the diaphragm and respiratory muscles alone are convulsed. In a few hours she is certainly lost; or, if there are moments of remission, they are speedily succeeded by increased heavings.

The practitioner unaccustomed to this fearful state of excitation, and forgetful or unaware of its cause, proceeds to bleed her, and he seals her fate. Although one system is thus convulsively labouring, it is because others are suddenly and perfectly exhausted; and by abstraction of the vital current he reduces this last hold of life to the helpless condition of the rest. There is not a more common or fatal error than this.

The veterinary practitioner is unable to apply the tepid bath to his larger patients, in order to quiet the erythmism of certain parts of the system, and produce an equable diffusion of nervous influence and action; and he often forgets it when he has it in his power to save the smaller ones. Let the bitch in a fit be put into a bath, temperature 96 degrees of Fahrenheit, and covered with the water, her head excepted. It will be surprising to

see how soon the simple application of this equable temperament will quiet down the erythmism of the excited system. In ten minutes, or a quarter of an hour, she may be taken out of the bath evidently relieved, and then, a hasty and not very accurate drying having taken place, she is wrapped in a blanket and placed in some warm situation, a good dose of physic having been previously administered. She soon breaks out in a profuse perspiration. Everything becomes gradually quiet, and she falls into a deep and long sleep, and at length awakes somewhat weak, but to a certain degree restored.

If, then, all her puppies except one or two are taken from her, and her food is, for a day or two, somewhat restricted, and after that given again of its usual quantity and kind, she will live and do well; but a bleeding at the time of her fit, or suffering all her puppies to return to her, will inevitably destroy her.

A bitch that was often brought to my house was suckling a litter of puppies. She was foolishly taken up and thrown into the Serpentine in the month of April. The suppression of milk was immediate and complete. There was also a determination to the head, and attacks resembling epilepsy. The puppies that were suffered to remain with the mother were very soon as epileptic as she was, and were destroyed. A seton was inserted on each side of her neck. Ipecacuanha was administered, and that having sufficiently worked, a small quantity of diluted sulphuric acid was given. A fortnight afterwards she was perfectly well.

Inversion of the Uterus in a Bull Bitch after Puppies. Extirpation and Cure. By M. Cross, M. V., Milan.—In July, 1829, I was desired to attend a small bull bitch six years old, and who had had puppies four times. The uterus was completely inverted, and rested all its weight on the vaginal orifice of the urethra, preventing the discharge of the urine, and thus being the cause of great pain when the animal endeavoured to void it, or the fecal matter. The uterus was become of almost a black colour, swelled, softened, and exhaling an insupportable odour. Judging from this that the preservation of the uterus was impossible, and reckoning much on the good constitution of the patient, I warned the proprietor of the danger of its reduction, even supposing that it was practicable, and proposed to him the complete extirpation of the uterus as the only means that remained of saving the bitch.

Armed with his consent, I passed a ligature round the neck of the uterus, at the bottom of the vagina, and drew it as tight as I possibly could. On the following day I again tightened the ligature, in order to complete the mortification of the part, and the separation of the womb. On the third day I extirpated the womb entirely, close to the haunch. There was very slight loss of blood,

but there ran from the walls of the vagina a small quantity of ichorous fluid, with a strong foetid smell. The operation was scarcely completed ere she voided a considerably quantity of urine, and then searched about for something to eat and to drink.

The portion of the uterus that was removed weighed fourteen ounces. The mucous membrane by which it was lined, was in a highly disorganized state. From time to time injections of a slight infusion of aromatic plants were introduced into the vagina, and the animal was nourished with liquid food of easy digestion.

The first day passed without the animal being in the slightest degree affected; but, on the following day, in despite of all our care, an ichorous fluid was discharged, which the dog would lick notwithstanding all our efforts to prevent it. The general health of the animal did not seem to be in the slightest degree affected. We continued our aromatic infusion and our regimen.

On the fourth day after the operation, the cords that had served as a ligature fell off, and all suppuration from the part gradually ceased.

October 20th.—Three months have passed since the operation, and she is perfectly well.

CHAPTER XIV.

THE DISTEMPER.

By this singular name is distinguished a prevalent disease now about to come under our consideration, which was first observed on the continent. The rapidity with which it spread, the strange protean appearances which it assumed, and its too frequent fatal termination, surprised and puzzled the veterinary surgeons; and they called it "*la maladie des chiens*," the disease or distemper in dogs.

It is comparatively a new disease. It was imported from France about one hundred years since, although some French authors have strangely affirmed that it is of British origin. Having once gained footing amongst us, it has established itself in our country, to the vexation and loss of the sportsman, and the annoyance of the veterinary surgeon. However keepers, or even men of education, may boast of their specifics, it is a sadly fatal disease, and destroys fully one-third of the canine race.

Dogs of all ages are subject to its attack. Many, nine and ten years old, have died of pure distemper; and I have seen puppies of only three weeks fall victims to it; but it oftenest appears between the sixth and twelfth month of the animal's life. If it occurs at an early period, it proves fatal in the great majority of cases; and, if the dog is more than four years old, it generally goes hard with him. It is undeniably highly contagious, yet it is frequently generated. In this it bears an analogy to mange, and to farcy and glanders in the horse.

One attack of the disease, and even a severe one, is no absolute security against its return; although the dog that has once laboured under distemper possesses a certain degree of immunity; or, if he is attacked a second time, the malady usually assumes a milder type. I have, however, known it occur three times in the same animal, and at last destroy him.

Violent catarrh will often terminate in distem-

per; and low and insufficient feeding will produce it. It frequently follows mange, and especially if mercury has been used in the cure of the malady. When we see a puppy with mange, and that peculiar disease in which the skin becomes corrugated, and more especially if it is a spaniel and pot-bellied or rickety, we generally say that we can cure the mange, but it will not be long before the animal dies of distemper; and so it happens in three cases out of four. Whatever debilitates the constitution predisposes it for the reception or the generation of distemper. It, however, frequently occurs without any apparent exciting cause.

That it is highly contagious cannot admit of doubt. A healthy dog can seldom, for many days, be kept with another that labours under distemper, without becoming affected; and the disease is communicated by the slightest momentary contact. There is, however, a great deal of caprice about this. I have more than once kept a dog in the foul-yard of my hospital for several successive weeks, and he has not become diseased. Inoculation with the matter that flows from the nose, either limpid or purulent, and in an early or advanced stage of the distemper, will, with few exceptions, produce the disease; yet I have failed to communicate it even by this method. Inoculation used to be recommended as producing a milder and less fatal disease. So far as my experience goes, the contrary has been the result.

Distemper is also epidemic. It occurs more frequently in the spring and autumn than in the winter and summer. If one or two dogs in a certain district are affected, we may be assured that it will soon extensively prevail there; and where the disease could not possibly be communicated by contagion. Sometimes it rages all over the country. At other times it is endemic, and confined to some particular district.

Not only is the disease epidemic or endemic, but the form which it assumes is so. In one season, almost every dog with distemper has violent fits; at another, in the majority of cases, there will be considerable chest affection, running on to pneumonia; a few months afterwards, a great proportion of the distempered dogs will be worn down by diarrhœa, which no medicine will arrest; and presently it will be scarcely distinguishable from mild catarrh.

It varies much with different breeds. The shepherd's dog, generally speaking, cares little about it; he is scarcely ill a day. The cur is not often seriously affected. The terrier has it more severely, especially the white terrier. The hound comes next in the order of severity; and after him the setter. With the small spaniel it is more dangerous; and still more so with the pointer, especially if he has the disease early. Next in the order of fatality comes the pug; and it is most fatal of all with the Newfoundland dog. Should a foreign dog be affected, he almost certainly dies. The greater part of the northern dogs brought by Captain Parry did not survive a twelvemonth; and the delicate Italian greyhound has little chance, when imported from abroad.

Not only does it thus differ in different species of dogs, but in different breeds of the same species. I have known several gentlemen who have laboured in vain for many years, to rear particular and valuable breeds of pointers and greyhounds. The distemper would uniformly carry off five out of six. Other sportsmen laugh at the supposed danger of distemper, and declare that they seldom lose a dog. This hereditary predisposition to certain kinds of disease cannot be denied, and is not sufficiently attended to. When a peculiar fatality has often followed a certain breed, the owner should cross it from another kennel, and especially from the kennel of one who boasts of his success in the treatment of distemper. This has occasionally succeeded far beyond expectation.

It is time to proceed to the symptoms of this disease; but here there is very considerable difficulty, for it is a truly protean malady, and it is impossible to fix on any symptom that will invariably characterize it.

An early and frequent symptom is a gradual loss of appetite, spirits, and condition: the dog is less obedient to his master, and takes less notice of him. The eyes appear weak and watery; and there will be a very slight limpid discharge from the nose. In the morning there will, perhaps, be a little indurated mucus at the inner corner of the eye. This may continue two or three weeks without serious or scarcely recognisable illness. Then a peculiar husky cough is heard, altogether different from the sonorous cough of catarrh, or the wheezing of asthma. It is an apparent attempt to get

something from the fauces or throat. By degrees the discharge from the eyes and nose, and particularly the former, will increase. More mucus will collect in the corners of the eye; and the eye will sometimes be closed in the morning. The conjunctiva, and particularly that portion which covers the sclerotica, will be considerably injected, but there will not be the usual intense redness of inflammation. The vessels will be large and turgid rather than numerous, and frequently of a darkish hue.

Occasionally, however, the inflammation of the conjunctiva will be exceedingly intense, the membrane vividly red, and the eye impatient of light. An opacity spreads over the cornea, and this is quickly succeeded by ulceration. The first spot of ulceration is generally found precisely in the centre of the cornea, and is perfectly circular: this will distinguish it from a scratch or other injury. The ulcer widens and deepens, and sometimes eats through the cornea, and the aqueous humour escapes. Fungous granulations spring from it, protrude through the lids, and the animal evidently suffers extreme torture.

A remarkable peculiarity attends this affection of the eye. However violent may be the inflammation, and by whatever disorganization it may be accompanied, if we can cure the distemper the granulations will disappear, the ulcer will heal, the opacity will clear away, and the eye will not eventually suffer in the slightest degree. One-fourth part of the mischief in other cases, unconnected with distemper, would inevitably terminate in blindness; but permanent blindness is rarely the consequence of distemper.

It may not be improper here shortly to revert to the different appearance of the eye in rabies. In the early stage of this disease there is an unnatural and often terrific brightness of the eye; but the cornea in distemper is from the first rather clouded. In rabies, there is frequent strabismus, with the axis of the eye distorted outwards. The apparent squinting of the eye in distemper is caused by the probably unequal protrusion of the membrana nictitans over a portion of the eye at the inner canthus, in order to protect it from the light. In rabies, the white cloudiness which I have described, and the occasional ulceration with very little cloudiness, and the ulceration, are confined to the cornea; but a dense green opacity comes on, speedily followed by ulceration and disorganization of every part of the eye.

The dog will, at this stage of distemper, be evidently feverish, and will shiver and creep to the fire. He will more evidently and rapidly lose flesh. The huskiness will be more frequent and troublesome, and the discharge from the nose will have greater consistence. It will be often and violently sneezed out, and will gradually become

more or less purulent. It will stick about the nostrils and plug them up, and thus afford a considerable mechanical obstruction to the breathing.

The progress of the disease is now uncertain. Sometimes fits come on, speedily following intense inflammation of the eye; or the inflammation of the nasal cavity appears to be communicated, by proximity, to the membrane of the brain. One fit is a serious thing. If it is followed by a second within a day or two, the chances of cure are diminished; and if they rapidly succeed each other, the dog is almost always lost. These fits seldom appear without warning; and, if their approach is carefully watched, they may possibly be prevented.

However indisposed to eat the dog may have previously been, the appetite returns when the fits are at hand, and the animal becomes absolutely voracious. Nature seems to be providing for the great expenditure of power which epilepsy will soon occasion. The mucus almost entirely disappears from the eyes, although the discharge from the nose may continue unabated: and for an hour or more before the fit there will be a champing of the lower jaw, frothing at the mouth, and discharge of saliva. The champing of the lower jaw will be seen at least twelve hours before the first fit, and will a little while precede every other. There will also be twitchings of some part of the frame, and usually of the mouth, cheek, or eyelid. It is of some consequence to attend to these, as enabling us to distinguish between fits of distemper and those of teething, worms, or unusual excitement. The latter come on suddenly. The dog is apparently well, and racing about full of spirits, and without a moment's warning he falls into violent convulsions.

We may here, likewise, be enabled to distinguish between rabies and distemper. When a person, unacquainted with dogs, sees a dog struggling in a fit, or running along unconscious of every surrounding object, or snapping at everything in his way, whether it be a human being or a stone, he raises the cry of "mad dog," and the poor brute is often sacrificed. The very existence of a fit is proof positive that the dog is not mad. No epilepsy accompanies rabies in any stage of that disease.

The inflammation of the membrane of the nose and fauces is sometimes propagated along that of the windpipe, and the dog exhibits unequivocal proofs of chest affection, or decided pneumonia.

At other times the bowels become affected, and a violent purging comes on. The fæces vary from white with a slight tinge of gray, to a dark slate or olive colour. By degrees mucus begins to mingle with the fæcal discharge, and then streaks of blood. The fæcal matter rapidly lessens,

and the whole seems to consist of mingled mucus and blood; and, from first to last, the stools are insufferably offensive. When the mingled blood and mucus appear, so much inflammation exists in the intestinal canal that the case is almost hopeless.

The discharge from the nose becomes decidedly purulent. While it is white, and without smell, and the dog is not too much emaciated, the termination may be favourable; but when it becomes of a darker colour, and mingled with blood, and offensive, the ethmoid or turbinated bones are becoming carious, and death supervenes. This will particularly be the case if the mouth and lips swell, and ulcers begin to appear on them, and the gums ulcerate, and a sanious and highly offensive discharge proceeds from the mouth. A singular, half-fetid smell arising from the dog, is the almost invariable precursor of death.

When the disease first visited the continent, it was regarded as a humoral disease. Duhamel, who was one of the earliest to study the character of the malady, contended that the biliary sac contained the cause of the complaint; the bile assumed a concrete form, and its superabundance was the cause of disease. Barrier, one of the earliest writers on the subject, described it as a violent irregular bilious fever. Others regarded it as a mucous discharge, or a depurative; and others, as a salutary crisis, removing from the constitution that which oppressed the different organs. Others had recourse to inoculation, in order to give it a more benign character; and others, and among them Chabert, considered that it possessed a character of peculiar malignity, and he gave it a name expressive of its nature and situation—*nasal catarrh*. It exhibited the ordinary symptoms of coryza: it was a catarrhal affection in its early stage; but it afterwards degenerated into a species of palsy. The causes were unknown. By some, they were attributed to the natural voracity of the dog; by others, to his occasional lasciviousness; by others, to his frequent feeding on carrion, or the refuse of fat and soups.

There is no doubt that nasal catarrh is, to a very considerable degree, contagious on the continent. It often spreads over a wide extent of country, and includes numerous animals of various descriptions. It is complicated with various diseases; and particularly, at an early stage, with ophthalmia. It may be interesting to the reader to trace the progress of the disease among our continental neighbours. It commences with a certain depression of spirits; a diminution of appetite; a heaviness of the head; a heat of the mouth; an attempt to get something from the throat; an insatiable thirst; an elevated temperature of the body; a dry and painful suffocating cough; and all these circumstances continue from

twenty to thirty days, until at length the dog droops and dies.

The duration of distemper is uncertain. It sometimes runs its course in five or six days; or it may linger on two or three months. In some cases the emaciation is rapid and extreme: danger is then to be apprehended. When the muscles of the loins are much attenuated, or almost wasted, there is little hope; and, although other symptoms may remit, and the dog may be apparently recovering, yet, if he continues to lose flesh, we may be perfectly assured that he will not live. On the other hand, let the discharge from the nose be copious, and the purging violent, and every other symptom threatening, yet if the animal gains a little flesh, we may confidently predict his recovery.

When the dog is much reduced in strength and flesh, a spasmodic affection or twitching of the muscles will sometimes be observed. It is usually confined at first to one limb; but the most decisive treatment is required, or these spasms will spread until the animal is altogether unable to stand; and while he lies every limb will be in motion, travelling, as it were, at the rate of twenty miles an hour, until the animal is worn out, and dies of absolute exhaustion. When these spasms become universal and violent, they are accompanied by constant and dreadful moans and cries.

In the pointer and the hound, and particularly when there is little discharge from the eyes or nose, an intense yellowness often suddenly appears all over the dog. He falls away more in twenty-four hours than it would be thought possible; his bowels are obstinately constipated; he will neither eat nor move; and in two or three days he is dead.

In the pointer, hound, and greyhound, there sometimes appears on the whole of the chest and belly a pustular eruption, which peels off in large scales. The result is usually unfavourable. A more general eruption, however, either wearing the usual form of mange, or accompanied by minute pustules, may be regarded as a favourable symptom. The disease is leaving the vital parts, and expending its last energy on the integument.

The *post-mortem* appearances are exceedingly unsatisfactory: they do not correspond with the original character of the disease, but with its strangely varying symptoms. If the dog has died in fits, we have inflammation of the brain or its membranes, and particularly at the base of the brain, with considerable effusion of a serous or bloody fluid. If the prevailing symptoms have led our attention to the lungs, we find inflammation of the bronchial passages, or, in a few instances, of the substance of the lungs, or the submucous tissue of the cells. We rarely have inflammation of the pulmonary plura, and never to any extent of

the intercostal pleura. In a few lingering cases, tubercles and vomicae of the lungs have been found.

If the bowels have been chiefly attacked, we have intense inflammation of the mucous membrane, and, generally speaking, the small intestines are almost filled with worms. If the dog has gradually wasted away, which is often the case when purging to any considerable extent has been encouraged or produced, we have contraction of the whole canal, including even the stomach, and sometimes considerable enlargement of the mesenteric glands.*

The membrane of the nose will always exhibit marks of inflammation, and particularly in the frontal sinuses and ethmoidal cells; and I have observed the portion of membrane on the septum, or cartilaginous division of the nostrils, between the frontal sinuses and ethmoidal cells, to be studded with small miliary tubercles. In advanced stages of the disease, attended with much defluxion from the nose, the cells of the ethmoidal bone and the frontal sinuses are filled with pus.

Ulceration is sometimes found on the membrane of the nose, oftenest on the spot to which I have referred—occasionally confined to that; and now and then spreading over the whole of the septum, and even corroding and eating through it; generally equal on both sides of the septum; in a few instances extending into the fauces; seldom found in the larynx, but occasionally seen in the bronchial passages. The other viscera rarely present any remarkable morbid appearance.

The distemper is clearly a disease of the mucous membranes, usually commencing in the membrane of the nose, and resembling nasal catarrh. In the early stage it is *coryza*, or nasal catarrh; but the affection rapidly extends, and seems to attack the mucous membranes generally, determined to some particular one, either by atmospheric influence or accidental causes, or constitutional predisposition. The fits arise from general disturbance of the system, or from the proximity of the brain to the early seat of inflammation.

* The following is a very frequent and unexaggerated history of distemper, when calomel has been given in too powerful doses:—

August 30, 1828.—A spaniel, six months old, has been ailing a fortnight, and three doses of calomel have been given by the owner. He has violent purging, with tenesmus and blood. Half an ounce of castor-oil administered.—31st. Astringents morning, noon, and night.—Sept. 6. The astringents have little effect, or, if the purging is restrained one day, it returns with increased violence on the following day. Getting rapidly thin. Begins to hulk. Astringents continued.—10th. The purging is at last overcome, but the huskiness has rapidly increased, accompanied by laborious and hurried respiration. Bled to the extent of three ounces.—11th. The breathing relieved, but he obstinately refuses to eat, and is forced several times in the day with arrow-root, or strong soup.—18th. He had become much thinner and weaker, and died in the evening. No appearance of inflammation on the thoracic viscera, nor in any part of the alimentary canal. The intestines are contracted through their whole extent.—Veterinarian, ii. 290.

This account of the nature and treatment of distemper will, perhaps, be unsatisfactory to some readers. One thing, however, is clear, that for a disease which assumes such a variety of forms, there can be no specific; yet there is not a keeper who is not in possession of some supposed infallible nostrum. Nothing can be more absurd. A disease attacking so many organs, and presenting so many and such different symptoms, must require a mode of treatment varying with the organ attacked and the symptom prevailing. The faith in these boasted specifics is principally founded on two circumstances—atmospheric influence and peculiarity of breed. There are some seasons when we can scarcely save a dog; there are others when we must almost wilfully destroy him in order to lose him. There are some breeds in which, generation after generation, five out of six die of distemper, while there are others in which not one out of a dozen dies. When the season is favourable, and the animal, by hereditary influence, is not disposed to assume the virulent type of the disease, these two important agents are overlooked, and the immunity from any fatal result is attributed to medicine. The circumstances most conducive to success will be the recollection that it is a disease of the mucous surfaces, and that we must not carry the depleting and lowering system too far. Keeping this in view, we must accommodate ourselves to the symptoms as they arise.

The natural medicine of the dog seems to be an emetic. The act of vomiting is very easily excited in him, and, feeling the slightest ailment, he flies to the dog-grass, unloads his stomach, and is at once well. In distemper, whatever be the form which it assumes, an emetic is the first thing to be given. Common salt will do when nothing else is at hand; but the best emetic, and particularly in distemper, consists of equal parts of calomel and tartar emetic. From half a grain to a grain and a half of each will constitute the dose.

This will act first as an emetic, and afterwards as a gentle purgative. Then, if the cough is urgent, and there is heaving at the flanks, and the nose is hot, a moderate quantity of blood may be taken—from three to twelve ounces—and this, if there has been previous constipation, may be followed by a dose of sulphate of magnesia, from two to six drachms.

In slight cases this will often be sufficient to effect a cure; but, if the dog still droops, and particularly if there is much huskiness, the antimonial or James's powder, nitre and digitalis, in the proportion of from half a grain to a grain of digitalis, from two to five grains of the James's powder, and from a scruple to a drachm of nitre, should be administered twice or thrice in a day. If on the third or fourth day the huskiness is not quite removed, the emetic should be repeated.

In these affections of the mucous membranes, it is absolutely necessary to avoid or to get rid of every source of irritation, and worms will generally be found a very considerable one in young dogs. If we can speedily get rid of them, distemper will often rapidly disappear; but, if they are suffered to remain, diarrhoea or fits are apt to supervene: therefore some warm medicine should be administered.

I have said that vomiting is very easily excited in the dog; and that for this reason we are precluded from the use of a great many medicines in our treatment of him. Calomel, aloes, jalap, scammony, and gamboge will generally produce sickness. We are, therefore, driven to some mechanical vermifuge; and a very effectual one, and that will rarely fail of expelling even the tapeworm, is tin filings or powdered glass. From half a drachm to a drachm of either may be advantageously given twice in the day. There may generally be added to them digitalis, James's powder, and nitre, made into balls with palm oil and a little linseed meal. This course should be pursued in usual cases until two or three emetics have been given, and a ball morning and night on the intermediate days. Should the huskiness not diminish after the first two or three days, if the dog has not rapidly lost flesh, I should be disposed to take a little more blood, and to put a seton in the poll. It should be inserted between the ears, and reaching from ear to ear.

When there is fever and huskiness, and the dog is not much emaciated, a seton is an excellent remedy; but, if it is used indiscriminately, and when the animal is already losing ground, and is violently purging, we shall only hasten his doom, or rather make it more sure.

It is now, if ever, that pneumonia will be perceived. The symptoms of inflammation in the lungs of the dog can scarcely be mistaken. The quick and laborious breathing, the disinclination or inability to lie down, the elevated position of the head, and the projection of the muzzle will clearly mark it. More blood must be subtracted, a seton inserted, the bowels opened with Epsom salts, and the digitalis, nitre, and James's powder given more frequently and in larger doses than before.

Little aid is to be derived from observation of the pulse of the dog; it differs materially in the breed, and size, and age of the animal. Many years' practice have failed in enabling me to draw any certain conclusion from it. The best place to feel the pulse of the dog is at the side. We may possibly learn from it whether digitalis is producing an intermittent pulse, which it frequently will do, and which we wish that it should do: it should then be given a little more cautiously, and in smaller quantities.

If the pneumonia is evidently conquered, or

we have proceeded thus far without any considerable inflammatory affection of the chest, we must begin to change our plan of treatment. If the huskiness continues, and the discharge from the nose is increased and thicker, and the animal is losing flesh and becoming weak, we must give only half the quantity of the sedative and diuretic medicine, and add some mild tonic, as gentian, chamomile, and ginger, with occasional emetics; taking care to keep the bowels in a laxative but not purging state. The dog should likewise be urged to eat; and, if he obstinately refuses all food, he should be forced with strong beef jelly, for a very great degree of debility will now ensue.

We have thus far considered the treatment of distemper from its commencement; but it may have existed several days before we were consulted, and the dog may be thin and husky, and refusing to eat. In such case we should give an emetic, and then a dose of salts, and after that proceed to the tonic and fever balls.

Should the strength of the animal continue to decline, and the discharge from the nose become purulent and offensive, the fever medicine must be omitted, and the tonic balls, with carbonate of iron, administered. Some veterinary surgeons are very fond of gum resins and balsams. Mr. Blaine, in his excellent treatise on the distemper in his Canine Pathology, recommends myrrh and benjamin, and balsam of Peru and camphor. I much doubt the efficacy of these drugs. They are beginning to get into disrepute in the practice of human medicine; and I believe that if they were all banished from the veterinary *Materia Medica*, we should experience no loss. When the dog begins to recover, although not so rapidly as we could wish, the tonic balls, without the iron, may be advantageously given, with now and then an emetic, if huskiness should threaten to return; but mild and wholesome food, and country or good air, will be the best tonics.

If the discharge from the nose become very offensive, the lips swelled and ulcerated, and the breath fetid, half an ounce of yeast may be administered every noon, and the tonics morning and night; and the mouth should be frequently washed with a solution of chloride of lime.

At this period of the disease the sub-maxillary glands are sometimes very much enlarged, and a tumour or abscess is formed, which, if not timely opened, breaks, and a ragged ill-conditioned ulcer is formed, very liable to spread, and very difficult to heal. It is prudent to puncture this tumour as soon as it begins to point, for it will never disperse. After the opening, a poultice should be applied to cleanse the ulcer; after which it should be daily washed with the compound tincture of benjamin, and dressed with calamine ointment.

Some balls should be given, and the animal liberally fed.

Should fits appear in an early stage, give a strong emetic; then bleed, and open the bowels with five or six grains of calomel, and a quarter of a grain of opium: after this insert a seton, and then commence the tonic balls.

The progress of fits in the early stages of the disease may thus be arrested. The occurrence of two or three should not make us despair; but if they occur at a later period, and when the dog is much reduced, there is little hope. This additional expenditure of animal power will probably soon carry him off. All that is to be done is to administer a strong emetic, obviate costiveness by castor-oil, and give the tonic balls with opium.

Of the treatment of the yellow disease little can be said; we shall not succeed in one case in twenty. When good effect has been produced, it has been by one large bleeding, opening the bowels well with Epsom salts, and then giving grain doses of calomel twice a-day in a tonic ball.

While it is prudent to obviate costiveness, we should recollect that there is nothing more to be dreaded, in every stage of distemper, than diarrhoea. The purging of distemper will often bid defiance to the most powerful astringents. This shows the folly of giving violent cathartics in distemper; and, when I have heard of the ten, and twenty, and thirty grains of calomel that are sometimes given, I have thought it fortunate that the stomach of the dog is so irritable. The greater part of these kill-or-cure doses is ejected, otherwise the patient would soon be carried off by super-purgation. There is an irritability about the whole of the mucous membrane that may be easily excited, but cannot be so readily allayed; and, therefore, except in the earliest stage of distemper, or in fits, or limiting ourselves to the small portion of calomel which enters into our emetic, I would never give a stronger purgative than castor-oil or Epsom salts. It is of the utmost consequence that the purging of distemper should be checked as soon as possible.

In some diseases a sudden purging, and even one of considerable violence, constitutes what is called the crisis. It is hailed as a favourable symptom; and from that moment the animal begins to recover; but this is never the case in distemper: it is a morbid action which is then going on, and which produces a dangerous degree of debility.

The proper treatment of purging in cases of distemper is first to give a good dose of Epsom salts, in order to carry away anything that may offend, and then to ply the animal with mingled absorbents and astringents. A scruple of powdered

chalk, ten grains of catechu, and five of ginger, with a quarter of a grain of opium, made into a ball with palm oil, may be given to a middle-sized dog twice or thrice every day. To this may be added injections of gruel, with the compound chalk mixture and opium.

When the twitchings which I have described begin to appear, a seton is necessary, whatever may be the degree to which the animal is reduced. Some stimulating embrocation, such as tincture of cantharides, may be rubbed along the whole course of the spine; and the medicine which has oftenest, but not always, succeeded is castor-oil, syrup of buckthorn, and syrup of white poppies, given morning and night, and a tonic ball at noon. If the dog will not now feed, he should be forced with strong soup. As soon, however, as the spasms spread over him, accompanied by a moaning that increases to a cry, humanity demands that we put an end to that which we cannot cure. Until this happens I would not despair; for many dogs have been saved that have lain several days perfectly helpless.

As to the chorea which I have mentioned as an occasional sequel of distemper, if the dog is in tolerable condition, and especially if he is gaining flesh, and the spring or summer is approaching, there is a chance of his doing well. A seton is the first thing; the bowels should be preserved from constipation; and the nitrate of silver, in doses of one-eighth of a grain, made into a pill with linseed meal, and increased to a quarter of a grain, should be given morning and night.

We should never make too sure of the recovery of a distempered dog, nor commit ourselves by too early a prognosis. It is a treacherous disease; the medicines should be continued until every symptom has fairly disappeared; and for a month at least.

It may be interesting to add the following account of the distemper in dogs by Dr. Jenner. Several of our modern writers have copied very closely from him.

"That disease among dogs which has familiarly been called the 'distemper,' has not hitherto, I believe, been much noticed by medical men. My situation in the country favouring my wishes to make some observations on this singular malady, I availed myself of it, during several successive years, among a large number of foxhounds belonging to the Earl of Berkeley; and, from observing how frequently it has been confounded with hydrophobia, I am induced to lay the result of my inquiries before the Medical and Chirurgical Society. It may be difficult, perhaps, precisely to ascertain the period of its first appearance in Britain. In this and the neighbouring counties, I have not been able to trace it back beyond the middle of the last century; but it has since spread universally. I knew a gentleman who, about forty-five years ago, destroyed the greater part of his hounds, from

supposing them mad, when the distemper first broke out among them; so little was it then known by those most conversant with dogs. On the continent I find it has been known for a much longer period; it is as contagious among dogs as the small-pox, measles, or scarlet fever among the human species; and the contagious miasmata, like those arising from the diseases just mentioned, retain their infectious properties a long time after separation from the distempered animal. Young hounds, for example, brought in a state of health into a kennel, where others have gone through the distemper, seldom escape it. I have endeavoured to destroy the contagion by ordering every part of the kennel to be carefully washed with water, then white-washed, and finally to be repeatedly fumigated with the vapour of marine acid, but without any good result.

"The dogs generally sicken early in the second week after exposure to the contagion; it is more commonly a violent disease than otherwise, and cuts off at least one in three that are attacked by it. It commences with inflammation of the substance of the lungs, and generally of the mucous membrane of the bronchi. The inflammation at the same time seizes on the membranes of the nostrils, and those lining the bones of the nose, particularly the nasal portion of the ethmoid bone. These membranes are often inflamed to such a degree as to occasion extravasation of blood, which I have observed coagulated on their surface. The breathing is short and quick, and the breath is often foetid; the teeth are covered with a dark mucus. There is frequently a vomiting of a glairy fluid. The dog commonly refuses food, but his thirst seems insatiable, and nothing cheers him like the sight of water. The bowels, although generally constipated as the disease advances, are frequently affected with diarrhoea at its commencement. The eyes are inflamed, and the sight is often obscured by mucus secreted from the eyelids, or by opacity of the cornea. The brain is often affected as early as the second day after the attack; the animal becomes stupid, and his general habits are changed. In this state, if not prevented by loss of strength, he sometimes wanders from his home. He is frequently endeavouring to expel by forcible expirations the mucus from the trachea and fauces, with a peculiar rattling noise. His jaws are generally smeared with it, and it sometimes flows out in a frothy state, from his frequent champing.

"During the progress of the disease, especially in its advanced stages, he is disposed to bite and gnaw anything within his reach; he has sometimes epileptic fits, and a quick succession of general though slight convulsive spasms of the muscles. If the dog survive, this affection of the muscles continues through life. He is often attacked with

fits of a different description; he first staggers, then tumbles, rolls, cries as if whipped, and tears up the ground with his teeth and fore feet; he then lies down senseless and exhausted. On recovering, he gets up, moves his tail, looks placid, comes to a whistle, and appears in every respect much better than before the attack. The eyes, during this paroxysm, look bright, and, unless previously rendered dim by mucus, or opacity of the cornea, seem as if they were starting from their sockets. He becomes emaciated, and totters from feebleness in attempting to walk, or from a partial paralysis of the hind legs. In this state he sometimes lingers on till the third or fourth week, and then either begins to show signs of returning health (which seldom happens when the symptoms have continued with this degree of violence), or expires. During convalescence, he has sometimes, though rarely, profuse hæmorrhage from the nose.

"When the inflammation of the lungs is very severe, he frequently dies on the third day. I knew one instance of a dog dying within twenty-four hours after the seizure: and in that short space of time the greater portion of the lungs was, from exudation, converted into a substance nearly as solid as the liver of a sound animal. In this case the liver itself was considerably inflamed, and the eyes and flesh universally were tinged yellow, though I did not observe anything obstructing the biliary ducts. In other instances I have also observed the eyes looking yellow.

"The above is a description of the disease in its several forms; but in this, as in the diseases of the human body, there is every gradation in its violence.

"There is also another affinity to some human diseases, viz., that the animal which has once gone through it very rarely meets with a second attack. Fortunately this distemper is not communicable to man. Neither the effluvia from the

diseased dog nor the bite have proved in any instance infectious; but, as it has often been confounded with canine madness, as I have before observed, it is to be wished that it were more generally understood; for those who are bitten by a dog in this state are sometimes thrown into such perturbation that hydrophobic symptoms have actually arisen from the workings of the imagination. Mr. John Hunter used to speak of a case somewhat of this description in his lectures.

"A gentleman who received a severe bite from a dog, soon after fancied the animal was mad. He felt a horror at the sight of liquids, and was actually convulsed on attempting to swallow them. So uncontrollable were his prepossessions, that Mr. Hunter conceived he would have died had not the dog which inflicted the wound been found and brought into his room in perfect health. This soon restored his mind to a state of tranquillity. The sight of water no longer afflicted him, and he quickly recovered."*

Palsy, more or less complete, is sometimes the termination of the distemper in dogs.

It is usually accompanied by chorea, and it is then, in the majority of cases, hopeless. Setons should be inserted in the poll, being then, as nearly as possible, at the commencement of the spinal cord. They should be well stimulated and worn a considerable time. If they fail, a plaster composed of common pitch, with a very small quantity of yellow wax and some powdered cantharides, spread on sheep's-skin, should be placed over the whole of the lumbar and sacral regions, extending half-way down the thigh on either side. The bowels should be kept open by mild aperients, in order that every source of irritation may be removed from the intestinal canal. Some mild and general tonic will likewise be useful, such as gentian and ginger.

CHAPTER XV.

SMALL-POX; MANGE; WARTS; CANCER; FUNGUS HEMATODES; SORE FEET.

SMALL-POX.

IN 1809, there was observed, at the Royal Veterinary School at Lyons, an eruptive malady among the dogs, to which they gave the name of *small-pox*. It appeared to be propagated from dog to dog by contagion. It was not difficult of cure; and it quickly disappeared when no other remedies were employed than mild aperients and diaphoretics. A sheep was inoculated from one of these dogs. There was a slight eruption of pustules formed on

the place of inoculation, but nowhere else; nor was there the least fever.

At another time, also, at the school at Lyons, a sheep died of the regular sheep-pox. A part of the skin was fastened, during four-and-twenty hours, on a healthy sheep, and the other part of it on a dog, both of them being in apparent good health. No effect was produced on the dog, but the sheep died of confluent sheep-pox.

* Medico-Chirurgical Transactions, 21st March, 1809.

The essential symptoms of small-pox in dogs succeed each other in the following order: the skin of the belly, the groin, and the inside of the forearm becomes of a redder colour than in its natural state, and sprinkled with small red spots irregularly rounded. They are sometimes isolated, sometimes clustered together. The near approach of this eruption is announced by an increase of fever.

On the second day, the spots are larger, and the integument is slightly tumefied at the centre of each.

On the third day, the spots are generally enlarged, and the skin is still more prominent at the centre.

On the fourth day, the summit of the tumour is yet more prominent. Towards the end of that day, the redness of the centre begins to assume a somewhat gray colour. On the following days, the pustules take on their peculiar characteristic appearance, and cannot be confounded with any other eruption. On the summit is a white circular point, corresponding with a certain quantity of nearly transparent fluid which it contains, and covered by a thin and transparent pellicle. This fluid becomes less and less transparent, until it acquires the colour and consistence of pus. The pustule, during its serous state, is of a rounded form. It is flattened when the fluid acquires a purulent character, and even slightly depressed towards the close of the period of suppuration, and when that of dessication is about to commence, which ordinarily happens towards the ninth or tenth day of the eruption. The dessication and the desquamation occupy an exceedingly variable length of time; and so, indeed, do all the different periods of the disease. What is the least inconstant, is the duration of the serous eruption, which is about four days, if it has been distinctly produced and guarded from all friction. If the general character of the pustules is considered, it will be observed that while some of them are in a state of serous secretion, others will only have begun to appear.

The eruption terminates when dessication commences in the first pustules; and if some red spots show themselves at that period of the malady, they disappear without being followed by the development of pustules. They are a species of abortive pustules. After the dessication, the skin remains covered by brown spots, which by degrees die away. There remains no trace of the disease, except a few superficial cicatrices on which the hair does not grow.

The causes which produce the greatest variation in the periods of the eruption are, the age of the dog, and the temperature of the situation and of the season. The eruption runs through its different stages with much more rapidity in dogs from one to five months old than in those of greater age.

I have never seen it in dogs more than eighteen months old. An elevated temperature singularly favours the eruption, and also renders it confluent and of a serous character. A cold atmosphere is unfavourable to the eruption, or even prevents it altogether. Death is almost constantly the result of the exposure of dogs having small-pox to any considerable degree of cold. A moderate temperature is most favourable to the recovery of the animal. A frequent renewal or change of air, the temperature remaining nearly the same, is highly favourable to the patient; consequently close boxes or kennels should be altogether avoided.

I have often observed that the perspiration or breath of dogs labouring under variola emits a very unpleasant odour. This smell is particularly observed at the commencement of the desiccation of the pustules, and when the animals are lying upon dry straw; for the friction of the bed against the pustules destroys their pellicles, and permits the purulent matter to escape; and the influence of this purulent matter is most pernicious. The fever is increased, and also the unpleasant smell from the mouth, and that of the fæces. In this state there is a disposition on which rapidly developed in the lungs to assume the character of pneumonia. This last complication is a most serious one, and almost always terminates fatally. It has a peculiar character. It shows itself suddenly, and with all its alarming symptoms. It is almost immediately accompanied by a purulent secretion from the bronchi, and the second day does not pass without the characters of pneumonia being completely developed. The respiration is accompanied by a mucous *râle* which often becomes sibilant. The nasal cavities are filled with a purulent fluid. The dog that coughs violently at the commencement of the disease employs himself, probably, on the following day in ejecting, by a forcible expulsion from the nostrils, the purulent secretion which is soon and plentifully developed. When he is lying quiet, and even when he seems to be asleep, there is a loud, stertorous, guttural breathing.

MANGE.

The existence of certain insects found burrowing under the skin of the human being, and of various tribes of animals, has been acknowledged from the 12th century. In the 17th century correct engravings of these insects were produced. On the other hand many doubted their existence, because it had not been their lot to see them. In 1812, Galès, a pupil in the hospital of St. Louis, pretended to have found some of them. They were put into the hands of M. Raspail, of Paris, who proved that they were nothing more than the common cheese mites; and substituted by Galès for those seen by Bonomo.

Professor Hertwig, of Berlin, has given a graphic sketch of these insects (Veterinarian, vol. xi. pp. 373, 489.)

Mr. Holthouse states that, "placed on the skin of a healthy individual, they excite a disease in the part to which they were confined, having all the characters of scabies; that insects taken from mangy sheep, horses, and dogs, and transplanted to healthy individuals of the same species, produce in them a disease analogous to that in the animals from which they were taken; and that there are too many well-attested cases on record to permit us to doubt of scabies having been communicated from animals to man.

Mange may in some degree be considered as an hereditary disease. A mangy dog is liable to produce mangy puppies, and the progeny of a mangy bitch will certainly become affected sooner or later. In many cases a propensity to the disease will be speedily produced. If the puppies are numerous, and confined in close situations, the effluvia of their transpiration and fecal discharges will often be productive of mange very difficult to be removed. Close confinement, salted food, and little exercise, are frequent causes of mange.

The Scabby Mange is a frequent form which this disease assumes. It assumes a pustular and scabby form in the red mange, particularly in white-haired dogs, when there is much and painful inflammation. A peculiar eruption, termed surfeit, which resembles mange, is sometimes the consequence of exposure to cold after a hot sultry day. Large blotches appear, from which the hair falls, and leaves the skin bare and rough. Acute mange sometimes takes on the character of erysipelas; at other times there is considerable inflammation. The animal exhibits heat and restlessness, and ulcerations of different kinds appear in various parts, superficial but extensive. Bleeding, aperient and cooling medicines are indicated, and also applications of the sub-acetate of lead, or spermaceti ointment. A weak infusion of tobacco may be resorted to when other things fail, but it must be used with much caution. The same may be said of all mercurial preparations. The tanner's pit has little efficacy, except in slight cases. Slight bleedings may be serviceable, and especially in full habits; setons may be resorted to in obstinate cases. A change in the mode of feeding will often be useful. Mild purgatives, and especially Epsom salts, are often beneficial, and also mercurial alteratives, as *Æthiops mineral* with cream of tartar and nitre. The external applications require considerable caution. If mercury is used, care must be taken that the dog does not lick it. The diarrhoea produced by mercury often has a fatal effect.

Unguents are useful, but considerable care must be taken in their application. They must be

applied to the actual skin, not over the hair. In old and bad cases much time and patience will be requisite. Mr. Blaine had a favourite setter who had virulent mange five years. He was ordered to be dressed every day, or every second day, before the disease was completely conquered.

Cutaneous affections have lately been prevalent to an extent altogether unprecedented on this and on the other side of the channel. In the latter part of 1843 the disease assumed a character which had not been known among us for many years. The common mange, which we used to think we could easily grapple with, was now little seen; even the usual red mange with the fox-coloured stain was not of more frequent occurrence than usual, but an intolerable itchiness with comparatively little redness of skin, and rarely sufficient to account for the torture which the animal seemed to endure, and often with not the slightest discoloration of the integument, came before us almost every day, and under its influence the dog became ill-tempered, dispirited, and emaciated, until he sunk under its influence. All unguents were thrown away here. Lotions of corrosive sublimate, decoction of bark, infusion of digitalis or tobacco, effected some little good, but the persevering use of the iodide of potassium, purgatives, and the abstraction of blood, very generally succeeded.

The sudden appearance of redness of the skin, and exudation from it, and actual sores attending the falling off of the hair, and itching that seemed to be intolerable, have also been prevalent to an unprecedented extent. This mange, however, is to a certain degree manageable. A dose or two of physic should be given, with an application of a calamine powder, and the administration of the iodide of potassium.

Mr. Blaine gives a most valuable account of mange in the dog, part of which I shall quote somewhat at length. Mange exerts a morbid constitutional action on the skin; it is infectious from various miasmata, and it is contagious from personal communication. In some animals it may be produced by momentary contact; it descends to other animals of various descriptions; there is no doubt that it is occasionally hereditary; it is generated by effluvia of many various kinds; almost every kind of rancid or stimulating food is the parent of it. High living with little exercise is a frequent cause of it, and the near approach of starvation is not unfavourable to it. The scabby mange is the common form under which it generally appears. In red mange the whole integument is in a state of acute inflammation; surfeit, or blotches, a kind of cuticular eruption, breaks out on particular parts of the body without the slightest notice, and, worse than all, a direct febrile attack, with swelling and ulceration, occurs, under

which the dog evidently suffers peculiar heat and pain. Last of all comes local mange. Almost every eruptive disease, whether arising from the eye, the ear, the scrotum, or the feet, is injurious to the quality as well as the health of every sporting dog: the scent invariably becomes diseased, and the general powers are impaired.

There are several accounts of persons who, having handled mangy dogs, have been affected with an eruption very similar to the mange. A gentleman and his wife, who had been in the habit of fondling a mangy pug dog, were almost covered with an eruption resembling mange. Several of my servants in the dog-hospital have experienced a similar attack; and the disease was once communicated to a horse by a cat that was accustomed to lie on his back as he stood in the stall.

WARTS.

These are often unpleasant things to have to do with. A Newfoundland dog had the whole of the inside of his mouth lined with warts. I applied the following caustic:—Hyd. sub-corrosivi ʒj., acidi mur. ʒ, alcoholis ʒiij., aque ʒij. The warts were touched twice every day, and in less than a fortnight they had all disappeared.

Another dog had its mouth filled with warts, and the above solution was applied. In four days considerable salivation came on, and lasted a week, but at the expiration of that time the warts had vanished. The owner of the dog had applied the solution with the tip of her finger; she experienced some salivation, which she attributed to this cause.

The skin of the dog, from the feebleness of its perspiratory functions, is little sensible to the influence of diaphoretics; therefore we trust so much to external applications for the cure of diseases of the skin of that animal.

CANCER.

This is a disease too frequent among females of the dog tribe, and occasionally seen in the male. Its symptoms, local and general, are various. They are usually very obscure in their commencement; they increase without any limit; they are exasperated by irritants of any kind; and in the majority of cases their reproduction is almost constant, and perfectly incurable.

With regard to the female, it is mostly connected with the secretion of milk. Two or three years may pass, and at almost every return of the period of œstrum, there will be some degree of enlargement or inflammation of the teats. Some degree of fever also appears; but, after a few weeks have passed away, and one or two physic balls have been administered, everything goes on well. In process of time, however, the period of œstrum is attended by a greater degree of fever

and enlargement of the teats, and at length some diminutive hardened nuclei, not exceeding in size the tip of a finger, are felt within one of the teats. By degrees they increase in size; they become hard, hot, and tender. A considerable degree of redness begins to appear. Some small enlargements are visible. The animal evidently exhibits considerable pain when these enlargements are pressed upon. They rapidly increase, they become more hot and red, various shining protuberances appear about the projection, and at length the tumour ulcerates. A considerable degree of sanious matter flows from the aperture.

The tumours, however, after a while diminish in size; the heat and redness diminish; the ulcer partly or entirely closes, but, after a while, and especially when the next period of œstrum arrives, the tumour again increases, and with far greater rapidity than before, and then comes the necessity of the removal of the tumour, or if not, the destruction of the animal. In the great majority of cases, the removal of the cancer does not destroy the dog, but lessens its torture. The knife and the forceps must usually be resorted to, and in the hands of a skilful surgeon the life of the animal will be saved.

When the cancer is attached to the neighbouring parts by cellular substance alone, no difficulty will be experienced in detaching the whole of it. The operation will be speedily performed, and there will be end of the matter, but, if the tumour has been neglected, and the muscular, the cellular, or even the superficial parts have been attacked, the utmost caution is requisite that every diseased portion shall be removed. Mr. Blaine adds to this, that "it must also be taken into the account, that, although in the canine cancer ulceration does not often reappear in the immediate part, when the operation has been judiciously performed, yet, when the constitution has been long affected with this ulcerative action, it is very apt to show itself in some neighbouring part soon after."

FUNGUS HEMATODES.

In the month of March, 1836, a valuable pointer dog was sent to Mr. Adam of Beaufort, quite emaciated, with total loss of appetite, and with a large fungus hematodes about the middle of the right side of his neck. It had begun to appear about five months before, and was not at first larger than a pea. Mr. Adam gave him a purgative of Barbadoes aloes, which caused the discharge of much fœtid matter from the intestines. At the expiration of three days he removed the tumour with the knife. There was a full discharge of healthy matter from the wound. During the period of its healing the animal was well fed, and ferruginous tonics were given. In a little more than three weeks the wound had completely

filled up with healthy granulations, and the dog was sent home to all appearance quite well.

At the expiration of three months another tumour made its appearance near the situation of the former one, growing fast; it had attained nearly the size of the other. Mr. Adam removed it immediately, ordering a system of nutritive feeding and tonics. It appeared at first to go on favourably; but, five days after the removal of the second one, a third made its appearance.

This was removed at the expiration of another five days; but the animal was totally unable to walk, with very laborious breathing and cold extremities. A cathartic was given and the legs bandaged; but the wounds made no progress towards healing, and at the end of three days he died. On exposing the cavity of the thorax it was almost covered with variously formed tumours, from the size of a pigeon's egg to that of a small pea. The intercostal muscles had many of these adhering to them, and a few small ones were developed on the heart. There were three on the diaphragm, in the centre of which matter was formed. The blood-vessels, kidneys, &c. were free from disease. These tumours were white, or nearly so, rather hard, and of a glandular substance. The external ones were soft, red, and almost destitute of blood-vessels, except the first, which bled considerably. There was dropsy of the abdomen.

SORE FEET

constitute a frequent and troublesome complaint. It consists of inflammation of the vascular substance, between the epidermis and the parts beneath. It is the result of numerous slight contusions produced by long travelling in dry weather, or hunting over a hard and rough country, or one covered with frost and snow. The irritation with which it commences continues to increase, and a certain portion of fluid is determined to the feet, and tubercles are formed, hard, hot, and tender, until the whole foot is in a diseased state, considerably enlarged. The animal sadly suffers, and is scarcely able to stand up for a minute. Sometimes the ardour of the chace will make him for a while forget all this; but on his return, and when he endeavours to repose himself, it is with difficulty that he can be got up again. The toes become enlarged, the skin red and tender, and the horny sole becomes detached and drops. Local fever, and that to a considerable extent, becomes established; it reacts on the general economy of the animal, who scarcely moves from his bed, and at length refuses all food. At other times a separation takes place between the dermis

and the epidermis, which is a perfect mass of serosity.

Still, however, it is only when all this has much increased, or has been neglected, that any permanently dangerous consequences take place. When violent inflammation has set in, the feet must be carefully attended to, or the dog may be lamed for life. One or two physic-balls may be given; all salted meat should be removed, and the animal supplied with food without being compelled to move from his bed. The feet should be bathed with warm water, and a poultice of linseed meal applied to them twice in the day. If, as is too often the case, he should tear them off, the feet should be often fomented. It is bad practice in any master of dogs to suffer them to be at all neglected when there are any tokens of inflammation of the feet. The neglect of even a few days may render a dog a cripple for life. If there are evident appearances of pus collecting about the claws, or any part of the feet, the abscess should be opened, well bathed with warm water, and friar's balsam applied to the feet.

When the feet have been neglected, the nail is apt to grow very rapidly, and curve round and penetrate into the foot. The forceps should be applied, and the claws reduced to their proper size.

If there are any indications of fever, or if the dog should be continually lying down, or he should hold up his feet, and keep them apart as much as he can, scarifications or poultices, or both, should be resorted to.

When the feet of a dog become sore in travelling, the foolish habit of washing them with brine should never be permitted, although it is very commonly resorted to. Warm fomentations, or warm pot-liquor, or poultices of linseed meal, should be applied, or, if matter is apparently forming, the lancet may be resorted to.

Dogs are frequently sent to the hospital with considerable redness between the toes and ichorous discharge, and the toes thickened round the base of the nails, as if they were inclined to drop off. The common alterative medicine should be given, and a lotion composed of hydrarg. oxym. gr. vi., alcohol 3j., et aq. calcis 3iij., should be applied to the feet three times every day. Leathern gloves should be sewn on them. These cases are often very obstinate.

Generally speaking, the dog has five toes on the fore feet, and four on the hind feet, with a mere rudiment of a fifth metatarsal bone in some feet; but, in others, the fifth bone is long and well proportioned, and advances as far as the origin of the first phalanx of the neighbouring toe.

CHAPTER XVI.

FRACTURES.

THESE are of not unfrequent occurrence in the dog; and I once had five cases in my hospital at the same time.

In the human subject, fractures are more frequent in adults, and, perhaps, in old men than in infants; but this is not the case with the smaller animals generally, and particularly with dogs. Five-sixths of the fractures occur between the time of weaning and the animal being six months old; not, perhaps, because of their chemical composition, that the bones are more fragile at this age, but because young dogs are more exposed to fall from the hands of the persons who carry them, and from the places to which they climb; and the extremities of the bones, then being in the state of epiphysis, are easily separated from the body of the bone. When the fracture takes place in the body of the bone, it is transverse or somewhat oblique, but there is scarcely any displacement.

A simple bandage will be sufficient for the reduction of these fractures, which may be removed in ten or twelve days, when the preparatory callus has acquired some consistence. One only out of twenty dogs that were brought to me with fractures of the extremities, in the year 1834, died. Two dogs had their jaws fractured by kicks from horses, and lost several of their teeth. In one of them the anterior part of the jaw was fractured perpendicularly; in the other, both branches were fractured. Plenty of good soup was injected into their mouths. Ten or twelve days afterwards, they were suffered to lap it; and in a little while they were dismissed cured.

It will be desirable, perhaps, to describe our usual method of reducing the greater part of the fractures which come under our notice.

I. The *humerus* was fractured just above the elbow and close to the joint. The limb was enclosed in adhesive plaster, and supported by a firm bandage. The bones were beginning to unite, when, by some means, concerning which I could never satisfy myself, the *tibia* was broken a little above the hock. Nothing could well be done with this second fracture; but great care was taken with regard to the former. The lower head of the humerus remained somewhat enlarged; but the lameness became very slight, and in three weeks had nearly or quite disappeared. Nothing was done to the second fracture; in fact, nothing more than a slight annular enlargement, surrounding the part, remained—a proof of the renovating power of nature.

II. A spaniel was run over by a light carriage. It was unable to put the left hind leg to the ground, and at the upper tuberosity of the ileum some crepitus could be distinguished. I subtracted six ounces of blood, administered a physic-ball, and ordered the patient to be well fomented with warm water several times during the night. On the following day no wound could be discovered, but there was great tenderness. I continued the fomentation. Two or three days afterwards she was evidently easier. I then had the hair cut close, and covered the loins and back with a pitch-plaster. At the expiration of six days the plaster was getting somewhat loose, and was replaced by another with which a very small quantity of powdered cantharides was mingled. At the expiration of the fifth week she was quite well.

III.—The *thigh-bone* had been broken a fortnight. It was a compound fracture: the divided edges of the bone protruded through the integuments, and there was no disposition to unite. It is not in one case in a hundred that an animal thus situated can be saved. We failed in our efforts, and the dog was ultimately destroyed.

IV.—The *femur* was broken near the hip. I saw it on the third day, when much heat and swelling had taken place. I ordered the parts to be frequently bathed with warm water. The heat and tenderness to a considerable degree subsided, and the pitch plaster was carefully applied. At the expiration of a week the plaster began to be loosened. A second one was applied, and when a fortnight longer had passed a slight degree of tenderness alone remained.

V.—The following account is characteristic of the bull terrier. The *radius* had been broken, and was set, and the bones were decidedly united, when the dog, in a moment of frantic rage, seized his own leg and crushed some of the bones. They were once more united, but his wrist bent under him in the form of a concave semicircle, as if some of the ligaments of the joint had been ruptured in the moment of rage. It was evident on the following day that it was impossible to control him, and he was destroyed.

VI.—A spaniel, three months old, became fractured half way between the wrist and the elbow. A surgeon bound it up, and it became swollen to an enormous size, from the adhesive plaster that had been applied and the manner of placing the splints. I removed the splints. On the following morning I had the arm frequently fomented: a

very indistinct crepitus could be perceived at the point of the humerus: I applied another plaster higher up, and including the elbow. The hair not having been cut sufficiently close, the plaster was removed, applied much more neatly and closely, and the original fracture was firmly bound together. No crepitus was now to be perceived.

I saw no more of our patient for four days, when I found that he had fallen, and that the elbow on the other side was fractured within the capsular ligament. A very distinct crepitus could be felt, and the dog cried sadly when the joint was moved. I would have destroyed him, but he was a favourite with his master, and we tried what a few days more would produce. I enclosed the whole of the limb in a plaster of pitch, and bound it up without splints. Both the bandages remained on nearly a fortnight, when the fractures were found to be perfectly united, and the lameness in both legs gradually disappeared.

VII.—*July 22, 1843.* A spaniel was frightened with something on the bed, and fell from it, and cried very much. The instep, or wrist, of the *right leg* before was evidently bowed, and there was considerable heat and tenderness. It was well fomented on the two following days and then set, and adhesive plaster was tightly applied, and a splint bound over that. *24th.* The foot began to swell, and was evidently painful. The outer bandage was loosened a little, but the inner bandage was not touched. *Aug. 4th.* The bandage that had not been meddled with for eleven days now appeared to give him some pain. For the last two days he has been gently licking and gnawing it. The splints were removed; but the adhesive plaster appearing even and firm, was suffered to remain. *26th.* Everything appeared to be going on well, when he again leaped from his bed. The wrist was much more bowed, and was tender and hot. Simple lint and a firm calico bandage were had recourse to. *27th.* He is unable to put his foot to the ground, and the joint is certainly enlarging. An adhesive plaster, made by a Frenchman, was applied at the owner's request, over which was placed a splint. The dog soon began to gnaw the plaster, which formed a sticky but not very adhesive mass. Before night the pain appeared to be very great, and the dog cried excessively. I was sent for. We well fomented the leg, and then returned to our former treatment. There was evidently a great deal of pain, but it gradually passed over, and a slight degree of lameness alone remained.

I have great pleasure in adding the following account of the successful treatment of fractures in dogs by Mr. Percival:—

“Hopeless as cases of fracture in horses generally are, from the difficulty experienced in managing the patient, they are by no means to be

so regarded in dogs. I have in several instances seen dogs recover, and with very good use of the parts, if not perfect restoration of them, when the accidents have been considered, at the time they took place, of a nature so irremediable as to render it advisable to destroy the animals.

“*May 4, 1839.*—A valuable Irish spaniel fell from a high wall, and fractured his *off shoulder*. On examination, I found the os humeri fractured about an inch above its radial extremity, causing the limb to drop pendulously from the side, and depriving the animal of all use of it. The arm, by which I mean the fore-arm, was moveable in any direction upon the shoulder, and there was distinct crepitus: in a word, the nature of the accident was too plain to admit of doubt; nor was there any splinter or loose piece of bone discoverable. I directed that the animal might be laid flat upon his sound side in a hamper, or covered basket or box, of sufficient dimensions, but not large enough to admit of his moving about; to have his hind legs fettered, his mouth muzzled, and his injured parts covered with a linen cloth wetted with a spirit lotion. *May 5.* The parts are tumefied, but not more, nor even so much as one might have expected. Continue the lotion. *6th.* At my request Mr. Youatt was called in to give his opinion as to the probability of effecting a cure. He thought from the inconvenient situation of the fracture, that the chances of success were doubtful; and recommended that a plaster, composed of thick sheep-skin and pitch, cut to the shape of the parts, should be applied, extending from the upper part of the shoulder down upon the arm, and reaching to the knee; and that the whole should be enveloped in well-applied bandages, one of them being carried over the shoulders and brought round between the fore legs, to support the limb, and aid in retaining the fractured ends in apposition. Prior to the application of the pitch plaster the hair was closely shorn off. Thus bound up the dog was replaced in his hamper, and had some aperient medicine given to him. *8th.* The medicine has operated; and he appears going on well, his appetite continuing unimpaired. *10th.* He growls when I open the basket to look at him. On examining him (while his keeper had hold of him), I found the plaster loosening from its adhesion; I took it off altogether, and applied a fresh one, composed of the stopping composition I use for horses' feet. *June 7.* Up to this time everything appears to have been going on properly. The fracture feels as if it were completely united, and, as the plaster continues to adhere firmly, I thought the bandages enveloping it, as they were often getting loose, might now be dispensed with, and that the dog might with benefit be chained to a kennel, instead of being so closely confined as he has been. In moving, he does not attempt to

use the fractured limb, but hops along upon the three other legs. *July*.—He has acquired pretty good use of the limb. Being now at liberty, he runs about a good deal; halting, from there being some shortness of the limb, but not so much as to prevent him being serviceable, as a 'slow' hunter, in the sporting-field.

"About a twelvemonth ago," continues Mr. Percivall, "I was consulted concerning a blood-hound of great size and beauty, and of the cost of £50, that had been a cripple in one of his hind limbs for some considerable time past, owing, it was said or thought, to having received some injury. After a very careful handling and examination of the parts about the hips, the places where he expressed pain, I came to the conclusion that there had been, and still existed, some fracture of the *ischial portion of the pelvis*, but precisely where, or of what nature, I could not determine; and all the treatment I could recommend was, that the animal should be shut up within a basket or box of some sort, of dimensions only sufficient to enable him to lie at ease, and that he be kept there for at least six months, without being taken out, save for the purpose of having his bed cleansed or renewed. His owner had previously made up his mind to have him destroyed: understanding, however, from me that there still remained a chance of his recovery, he ordered his groom to procure a proper basket, and see that the dog's confinement was such as I had prescribed. The man asked me to allow him to have his kennel, which, being no larger than was requisite for him, I did not object to; and to this he had an iron lattice-door made, converting it into a sort of wild beast cage. After two months' confinement I had him let out for a short run, and perceived evident amendment. I believe altogether that he was imprisoned five months, and then was found so much improved that I had him chained to his kennel for the remaining month, and this, I believe, was continued for another month. The issue was the complete recovery of the animal, very much to the gratification and joy of his master, by whom he is regarded as a kind of unique or unobtainable production.

"The fractures of dogs and other animals must, of course, be treated in accordance with all the circumstances of their cases; but I have always considered it a most essential part of their treatment that such portable patients as dogs and cats, &c., should be placed and kept in a state of confinement where they either could not, or were not likely to, use or move the fractured parts; and, moreover, I have thought that failure, where it has resulted after such treatment, has arisen from its not having been sufficiently long persisted in."

In the opinion of Professor Simonds, when

there is fracture of the bones of the extremities, a starch bandage is the best that can be employed. If applied wet, it adapts itself to the irregularities of the limbs, and if allowed to remain on twelve hours undisturbed it forms a complete case for the part, and affords more equal support than anything else that can possibly be used.

The following case was one of considerable interest. It came under the care of Professor Simonds. Two gentlemen were playing at quoits, and the dog of one of them was struck on the head by a quoit, and supposed to be killed. His owner took him up, and found that he was not dead, although dreadfully injured. It being near the Thames, his owner took him to the edge of the river, and dashed some water over him, and he rallied a little. Professor Simonds detected a fracture of the skull, with pressure on the brain, arising from a portion of depressed bone. The dog was perfectly unconscious, frequently moaning, quite incapable of standing, and continually turning round upon his belly, his straw, or his bed. It was a case of coma; he took no food, and the pulsation at the heart was very indistinct.

"I told the proprietor that there was no chance of recovery except by an operation; and, even then, I thought it exceedingly doubtful. I was desired to operate, and I took him home.

"The head was now almost twice as large as when the accident occurred, proceeding from a quantity of coagulated blood that had been effused under the skin covering the skull. I gave him a dose of aperient medicine, and on the following morning commenced my operation.

"The hair was clipped from the head, and an incision carried immediately from between the eye-brows to the back part of the skull, in the direction of the sagittal suture. Another incision was made from this towards the root of the ear. This triangular flap was then turned back, in order to remove the coagulated blood and make a thorough exposure of the skull. I was provided with a trephine, thinking that only a portion of the bone had been depressed on the brain, and it would be necessary, with that instrument, to separate it from its attachment, and then with an elevator remove it; but I found that the greater part of the parietal bone was depressed, and that the fracture extended along the sagittal suture from the coronal and lambdoidal sutures. At three-fourths of the width of the bone, the fracture ran parallel with the sagittal suture, and this large portion was depressed upon the tunics of the brain, the dura mater being considerably lacerated. The depressed bone was raised with an elevator, and I found from its lacerated edges and the extent of the mischief done, that it was far wiser to remove it entirely, than to allow it to remain and take the chance of its uniting.

"In a few days the dog began to experience relief from the operation, and to be somewhat conscious of what was taking place around him. He still requires care and attention, and proper medicinal agents to be administered from time to time; but with the exception of occasionally turning round when on the floor, he takes his food well, and obeys his master's call."*

CHAPTER XVII.

MEDICINES USED IN THE TREATMENT OF THE DISEASES OF THE DOG.

THESE are far more numerous and complicated than would, on the first consideration of them, be imagined. The Veterinary Surgeon has a long list of them, suited to the wants and dangers, imaginary or real, of his patients; and he who is not scientifically acquainted with them will occasionally blunder in the choice of remedies, or the application of the means of cure which he adopts. Little attention may, perhaps, be paid to the medical treatment of the dog; yet it requires not a little study and experience. I will endeavour to give a short account of the drugs, and mode of using them, generally employed.

The administering of medicines to dogs is, generally speaking, simple and safe, if a little care is taken about the matter, and especially if two persons are employed in the operation. The one should be sitting with the dog between his knees, and the hinder part of the animal resting on the floor. The mouth is forced open by the pressure of the fore-finger and thumb upon the lips of the upper jaw, and the medicine can be conveniently introduced with the other hand, and passed sufficiently far into the throat to ensure its not being returned. The mouth should be closed, and kept so until the bolus has been seen to pass down. Mr. Blaine thus describes the difference between the administration of liquid and solid medicines:—"A little attention will prevent all danger. A ball or bolus should be passed completely over the root of the tongue, and pushed some way backward and forward. When a liquid is given, if the quantity is more than can be swallowed at one effort, it should be removed from the mouth at each deglutition, or the dog may be strangled. Balls of a soft consistence and those composed of nauseous ingredients, should be wrapped in thin paper, or they may disgust the dog, and produce sickness."

Dogs labouring under disease should be carefully nursed: more depends on this than many persons seem to be aware. A warm and comfortable bed is of a great deal more consequence than many persons who are fond of their dogs imagine. Cleanliness is also an essential point. Harshness of manner and unkind treatment will evidently aggravate many of their complaints. I have sometimes witnessed an angry word spoken to a healthy

dog produce instant convulsions in a distempered one that happened to be near; and the fits that come on spontaneously in distemper, almost instantly leave the dog by soothing notice of him.

Acidum Acetum (Vinegar).—This is useful for sprains, bruises, and fomentations.

Acidum Nitricum (Nitric Acid; Aqua Fortis).—This may be used with advantage to destroy warts or fungous excrescences. A little of the acid should be dropped on the part and bound tightly down. The protuberance will slough off and healthy granulations will spring up. A surer application, however, is the nitrate of silver.

Acidum Hydrocyanicum (Prussic Acid).—This is an excellent application for the purpose of allaying irritation of the skin in dogs; but it must be very carefully watched. I have seen a drachm of it diluted with a pint of distilled water, rapidly allay cuticular inflammation. The dreadful degree of itching which had been observed during the last two or three years yielded to this application alone; and to that it has almost invariably yielded, a little patience being used.

Acupuncture is a practice lately introduced into veterinary surgery. It denotes the insertion of a needle into the skin or flesh of a person or animal suffering severely from some neuralgic affection. The needle is small and sharp; it is introduced by a slight pressure and semi-rotating motion between the thumb and fore-finger, and afterwards withdrawn with the same motion. This should always employ a quarter of an hour at least, and in cases of very great pain it should continue two hours; but when the object is to afford an exit to the fluid collected, mere puncture is sufficient. It is attended with very little pain; and therefore it may be employed at least with safety if not with advantage. The operation was known and practised in Japan many years ago; but it was only in the seventeenth century that its singular value was ascertained. In 1810 some trials of it were made in Paris, and M. Chenel took the lead. He had a young dog that he had cured of distemper, except that a spasmodic affection of the left hind leg remained. He applied a needle, and with fair success. He failed with another dog; but M. Prevost, of Geneva, relieved two

* Trans. Vet. Med. Assoc., i. 51.

mares from rheumatism, and an entire horse that had been lame sixteen months. In the Veterinary School at Lyons acupuncture was tried on two dogs. One had chorea, and the other chronic paralysis of the muscles of the neck. The operation had no effect on the first; the other came out of the hospital completely cured. In the following year acupuncture was tried without success in the same school. Four horses and two dogs were operated upon in vain.

Adeps (Hog's Lard) forms the basis of all our ointments. It is tasteless, inodorous, and free from every stimulating quality.

Alcohol (Rectified Spirit).—This is principally used in tinctures, and seldom or never administered to the dog in a pure state.

Aloes, Barbadoes.—From these are formed the safest and best aperients for the dog—consisting of powdered aloes eight parts, antimonial powder one part, ginger one part, and palm oil five parts; beaten well together, and the size of the ball varying from half a drachm to two drachms, and a ball administered every fourth or fifth hour. Mr. Blaine considers it to be the safest general purgative. He says, that such is the peculiarity of the bowels of the dog, that while a man can take with impunity as much calomel as would kill two large dogs, a moderate-sized dog will take a quantity of aloes sufficient to destroy two stout men. The smallest dog can take 15 or 20 grains; half a drachm is seldom too much; but the smaller dose had better be tried first, for hundreds of dogs are every year destroyed by temerity in this particular. Medium-sized dogs usually require a drachm; and some large dogs have taken two or even three drachms.

Alteratives are medicines that effect some slow change in the diseased action of certain parts, without interfering with the food or work. The most useful consist of five parts of sublimed sulphur, one of nitre, one of linseed meal, and two of lard or palm oil.

Alum is a powerful astringent, whether employed externally or internally. It is occasionally administered in doses of from 10 to 15 grains in obstinate diarrhoea. In some obstinate cases, alum whey has been employed in the form of a clyster.

Oxide of Antimony, in the form of a compound powder, and under the name of James's powder, is employed as a sudorific, or to cause a determination to the skin.

The *Antimonii Potassio Tartras (Tartar Emetic)*, besides its effect on the skin, is a useful nauseant, and invaluable in inflammation of the lungs and catarrhal affections of every kind. The *Black Sesquisulphuret of Antimony* is a compound of sulphur and antimony, and an excellent alterative.

Argenti Nitras—Nitrate of Silver (Lunar Caustic).—I have already strongly advocated the

employment of this caustic for empoisoned wounds and bites of rabid animals. In my opinion it supersedes the use of every other caustic, and generally of the knife. I have also given it internally as a tonic to the dog, in cases of chorea, in doses from an eighth to a quarter of a grain. A dilute solution may be employed as an excitant to wounds, in which the healing process has become sluggish. For this purpose, ten grains or more may be dissolved in a fluid ounce of distilled water. A few fibres of tow dipped in this solution, being drawn through the channel which is left on the removal of a seton, quickly excite the healing action. Occasionally one or two drops of this solution may be introduced into the eye for the purpose of removing opalescence of the cornea. In cases of fungoid matter being thrown out on the cornea, the fungus may be touched with a rod of nitrate of silver, and little pain will follow.

The *Peruvian Bark*, or its active principle the disulphate of quina, is a valuable tonic in distemper, especially when combined with the iodide of iron; the iron increasing the general tone of the system, and the iodine acting as a stimulant to the absorbents.

Blisters are occasionally useful or indispensable in some of the casualties and diseases to which the dog is liable. They are mostly of the same description, and act upon the same principles as in the horse, whether in the form of plaster, or ointment, or stimulating fluid. Blisters can be kept on the dog with difficulty: nothing short of a wire muzzle will suffice; Mr. Blaine says, that for very large dogs, he used to be compelled to make use of a perforated tin one. The judgment of the practitioner will determine in these cases, as well as with regard to the horse, whether the desired effect should be produced by severe measures or by those of a milder character, by active blisters or by milder stimulants: the difficulty of the measures to be adopted, and the degree of punishment that may be inflicted, being never forgotten by the operator.

We have stated in 'The Horse,' that "the art of blistering consists in cutting or rather shaving the hair perfectly close; then well rubbing in the ointment, and afterwards, and, what is of the greatest consequence of all, plastering a little more of the ointment lightly over the part, and leaving it. As soon as the vesicles have perfectly risen, which will be in twenty or twenty-four hours, the torture of the animal may be somewhat relieved by the application of olive or neat's-foot oil, or any emollient ointment.

"An infusion of two ounces of the cantharides in a pint of oil of turpentine, for several days, is occasionally used as a languid blister; and when sufficiently lowered with common oil, it is called a *sweating oil*, for it maintains a certain degree of

irritation and inflammation on the skin, yet not sufficient to blister; and thus gradually abates or removes some old or deep inflammation or cause of lameness."*

Iodine in various cases is now rapidly superseding the cantharides and the turpentine.

Calomel.—Sufficient has been said of this dangerous medicine in the course of the present work. I should rarely think of exhibiting it, except in small doses for the purpose of producing that specific influence on the liver which we know to be the peculiar property of this drug. In large doses it will to a certain extent produce vomiting; and, if it finds its way into the intestines, it acts as a powerful drastic purgative.

Castor Oil (Oleum Ricini).—This is a most valuable medicine. It is usually combined with the syrup of buckthorn and white poppies, in the proportions of three parts of the oil to two of the buckthorn and one of the poppy-syrup; which form a combination of ingredients in which the oleaginous, stimulant, and narcotic ingredients happily blend.

Catechu.—This is an extract from the wood of an acacia tree (*Acacia catechu*), and possesses a powerful astringent property. It is given in cases of superpurgation, united with opium, chalk, and powdered gum. A tincture of it is very useful for the purpose of hastening the healing principle of wounds. Professor Morton says that he considers it as the most valuable of the vegetable astringents.

Clysters.—Professor Morton gives an account of the use of clysters. The objects, he says, for which they are administered are—1. To empty the bowels of fæces: thus they act as an aperient. Also to induce a cathartic to commence its operations when, from want of exercise or due preparation, it is tardy in producing the desired effect. Clysters operate in a twofold way: first, by softening the contents of the intestines; and, secondly, by exciting an irritation in one portion of the canal which is communicated throughout the whole; hence they become valuable when the nature and progress of the disease require a quick evacuation of the bowels. The usual enema is warm water, but this may be rendered more stimulating by the addition of salt, oil, or aloes. 2. For the purpose of killing worms that are found in the rectum and large intestines; in this case it is usually of an oleaginous nature. 3. For restraining diarrhoea: sedatives and astringents being then employed. 4. For nourishing the body when food cannot be received by the mouth. Gruel is generally the aliment thus given. 5. For allaying spasms in the stomach and bowels.

Copper.—Both the verdigris, or subacetate, and the blue vitriol of sulphate of copper are now comparatively rarely used. They are employed

either in the form of a fine powder, or mixed with an equal quantity of the acetate of lead in order to destroy proud flesh or stimulate old ulcers. They also form a part of the ægyptiacum of the farrier. There are many better drugs to accomplish the same purpose.

Creosote is seldom used for the dog. We have applications quite as good and less dangerous. It may be employed as a very gentle excitant and antiseptic.

Creta Preparata (Chalk), in combination with ginger, catechu, and opium, is exceedingly useful; indeed, it is our most valuable medicine in all cases of purging, and particularly the purging of distemper.

Digitalis is an exceedingly valuable drug. It is a direct and powerful sedative, a mild diuretic, and useful in every inflammatory and febrile complaint.

Gentian and *Ginger* are both valuable; the first as a stomachic and tonic, and the last as a cordial and tonic. It is occasionally necessary, or at least desirable, to draw this distinction between them.

Chloride of Lime is a useful application for ill-conditioned wounds and for the frequent cleansing of the kennel.

Epsom Salts, or *Sulphate of Magnesia*, are mild yet effective in their action: with regard to cattle and sheep, they supersede every other aperient; for the dog, however, they must yield to the castor-oil mixture.

Mercury.—The common mercurial ointment is now comparatively little used. It has given way to the different preparations of iodine. In direct and virulent mange, it is yet, however, employed under the form of calomel, and combined with aloes, but in very small doses, never exceeding three grains. It is also useful in farcy and jaundice. The corrosive sublimate is occasionally used for mange in the dog, and to destroy vermin; but it is a very uncertain and dangerous medicine.

Palm Oil would be an excellent emollient, if it were not so frequently adulterated with tumeric root in powder. It is far milder than the common lard.

Nitrate of Potash is a valuable cooling and mild diuretic, in doses of eight or ten grains.

Sulphur is the basis of the most effectual applications for mange. It is a good alterative, combined usually with antimonials and nitre, and particularly useful in mange, surfeit, grease, hide-bound, and want of condition.

Turpentine is an excellent diuretic and antispasmodic; it is also a most effectual sweating blister and highly useful in strains.

The Sulphate of Zinc is valuable as an excitant to wounds, and promotes adhesion between divided surfaces and the *radix*.

* The Horse, p. 501.

APPENDIX.

THE NEW LAWS OF COURSING,

AS REVISED AND ENLARGED AT A MEETING OF NOBLEMEN AND GENTLEMEN, HELD AT THE
THATCHED HOUSE TAVERN, ST. JAMES'S STREET, JUNE 1, 1839.

I. Two stewards shall be appointed by the members at dinner each day, to act in the field the following day, and to preside at dinner. They shall regulate the plan of beating the ground, under the sanction of the owner or occupier of the soil.

II. Three or five members, including the secretary for the time being, shall form a Committee of Management, and shall name a person, for the approbation of the members, to judge all courses—all doubtful cases shall be referred to them.

III. All courses shall be from slips, by a brace of greyhounds only.

IV. The time of putting the first brace of dogs in the slips shall be declared at dinner on the day preceding. If a prize is to be run for, and only one dog is ready, he shall run a by, and his owner shall receive forfeit: should neither be ready, the course shall be run when the Committee shall think fit. In a match, if only one dog be ready, his owner shall receive forfeit; if neither be present, the match shall be placed the last in the list.

V. If any person shall enter a greyhound by a name different from that in which he last appeared in public, without giving notice of such alteration, he shall be disqualified from winning, and shall forfeit his match.

VI. No greyhounds shall be entered as puppies unless born on or after the 1st of January of the year preceding the day of running.

VII. Any member, or other person, running a greyhound at the meeting, having a dog at large which shall join in the course then running, shall forfeit one sovereign; and, if belonging to either of the parties running, the course shall be decided against him.

VIII. The judge ought to be in a position where he can see the dogs leave the slips, and to decide by the colour of the dogs to a person appointed for that purpose: his decision shall be final.

IX. If, in running for prizes, the judge shall be of opinion that the course has not been of sufficient length to enable him to decide as to the merits of the dogs, he shall inquire of the Committee whether he is to decide the course or not; if in the negative, the dogs shall be immediately put again into the slips.

X. The judge shall not answer any questions put to him regarding the course, unless such questions are asked by the Committee.

XI. If any member make any observation in the hearing of the judge respecting a course, during the time of running, or before he shall have delivered his judgment, he shall forfeit one sovereign to the fund; and, if either dog be his own he shall lose the course. If he impugn the decision of the judge, he shall forfeit two sovereigns.

XII. When a course of an average length is so equally divided that the judge shall be unable to decide it, the owners of the dogs may toss for it; but, if either refuse, the dogs shall be again put in the slips, at such time as the Committee may think fit; but, if either dog be drawn, the winning dog shall not be obliged to run again.

XIII. In running a match the judge may declare the course to be undecided.

XIV. If a member shall enter more than one greyhound, *bonâ fide* his own property, for a prize, his dogs shall not run together, if it be possible to avoid it; and, if two greyhounds, the property of the same member, remain to the last tie, he may run it out or draw either, as he shall think fit.

XV. When dogs engaged are of the same colour, the last drawn shall wear a collar.

XVI. If a greyhound stand still in a course when a hare is in his or her sight, the owner shall lose the course: but, if a greyhound drops from exhaustion, and it shall be the opinion of the judge that the merit up to the time of falling was greatly in his or her favour, then the judge shall have power to award the course to the greyhound so falling, if he think fit.

XVII. Should two hares be on foot, and the dogs separate before reaching the hare slipped at, the course shall be undecided, and shall be run over again at such time as the Committee shall think fit, unless the owners of the dogs agree to toss for it,

or to draw one dog; and if the dogs separate after running some time, it shall be at the discretion of the Committee whether the course shall be decided up to the point of separation.

XVIII. A course shall end if either dog be so unsighted as to cause an impediment in the course.

XIX. If any member or his servant ride over his opponent's dog when running, so as to injure him in the course, the dog so ridden over shall be deemed to win the course.

XX. It is recommended to all union meetings to appoint a committee of five, consisting of members of different clubs, to determine all difficulties and cases of doubt.

THE FOLLOWING GENERAL RULES ARE RECOMMENDED TO JUDGES FOR THEIR GUIDANCE:—

The features of merit are—

The race from slips, and the first turn or wrench of the hare (provided it be a fair slip), and a straight run-up.

Where one dog gives the other a go-by when both are in their full speed, and turns or wrenches the hare. (N.B. If one dog be in the stretch, and the other only turning at the time he passes, it is not a fair go-by.)

Where one dog turns the hare when she is leading homewards, and keep the lead so as to serve himself, and makes a second turn of the hare without losing the lead.

A catch or kill of the hare, when she is running straight and leading homewards, is fully equal to a turn of the hare when running in the same direction, or perhaps more, if he show the speed over the other dog in doing it. If a dog draws the

fleck from the hare, and causes her to wrench or rick only, it is equal to a turn of the hare when leading homewards.

When a dog wrenches or ricks a hare twice following, without losing the lead, it is equal to a turn.

N.B. It often happens when a hare has been turned, and she is running from home, that she turns of her own accord to gain ground homeward, when both dogs are on the stretch after her: in such a case the judge should not give the leading dog a turn.

There are often other minor advantages in a course, such as one dog showing occasional superiority of speed, turning on less ground, and running the whole course with more fire than his opponent, which must be left to the discretion of the judge, who is to decide on the merits.

LOCAL RULES.

I. The number of members shall be regulated by the letters in the alphabet, and the two junior members shall take the letters X and Z, if required.

II. The members shall be elected by ballot, seven to constitute a ballot, and two black balls to exclude.

III. The name of every person proposed to be balloted for as a member, shall be placed over the chimney-piece one day before the ballot can take place.

IV. No proposition shall be balloted for unless put up over the chimney-piece, with the names of the proposer and seconder, at or before dinner preceding the day of the ballot, and read to the members at such dinner

V. Every member shall, at each meeting, run a greyhound his own property, or forfeit a sovereign to the club.

VI. No member shall be allowed to match more than two greyhounds in the first class, under a penalty of two sovereigns to the fund, unless such member has been drawn or run out for the prizes, in which case he shall be allowed to run three dogs in the first class.

VII. If any member shall absent himself two seasons without sending his subscription, he shall be deemed out of the society, and another chosen in his place.

VIII. No greyhound shall be allowed to start if any arrears are due to this Society from the owner.

IX. Any member lending another a greyhound for the purpose of saving his forfeit (excepting by consent of the members present) shall forfeit five sovereigns.

X. Any member running the dog of a stranger in a match shall cause the name of the owner to be inserted after his own name in the list, under a penalty of one sovereign.

XI. No stranger shall be admitted into the Society's room, unless introduced by a member,

who shall place the name of his friend over the chimney-piece, with his own attached to it; and no member shall introduce more than one friend.

XII. The members of the Clubs shall be honorary members of this Society, and when present shall be allowed to run their greyhounds on payment of the annual subscription.

XIII. This Society to meet on the in , and course on the following days.



HEAD OF THE BLOOD-HOUND.

[CONCLUSION OF THE DOG.]

THE HOG.



BY W. C. L. MARTIN,

LATE ONE OF THE SCIENTIFIC OFFICERS OF THE ZOOLOGICAL SOCIETY
OF LONDON.

THE HOG.

CHAPTER I.

THE HOG TRIBE.

FROM among the cloven-footed or many-toed animals of the pachydermatous order of mammalia,* man has subjugated and reclaimed only two—viz., the hog and the elephant. With respect to the latter the subjugation applies only to *individuals*, not to a *race*; for, strange to say, the elephant reclaimed and in captivity does not breed, at least as a general rule; hence it is from the wild herds that man recruits his stock, and the obedient beasts which obey the voice of their keeper, labour at his bidding, or astonish an audience by the precision with which they act their rôle in the melodrama, have been captured in their native forests, tamed, and educated. In this point of view the elephant stands alone. All our other domesticated quadrupeds—the horse, the ass, the hog, the dog, the ox, the camel, the sheep, the goat, the cat—are the descendants of a long line of ancestry in a state of servitude. Of many of these (at so remote a period has their subjugation been effected, and so much has cultivation, carried on age after age, altered their original characters) the wild type, if it be yet extant, cannot be positively recognised. From no such line of hereditary bond-slaves does the domestic elephant proceed. Each individual is in truth a captive—it was born free: when it perishes, its place must be supplied by another captive. So much with regard to the elephant.† We need not say that the domestic hog, unlike the elephant, forms no exception to the general rule. It is the descendant of a race long since subjugated; yet one thing is remarkable, in all past ages and at the present day, while a race of domesticated swine has been and is kept under surveillance, the wild type whence this race sprung has maintained itself in its native freedom, the fierce denizen of the forest, and one of the renowned beasts of “venerie.” Whatever doubts may exist as to the true origin of the dog, the horse, the ox, and others, or as to whether their origin is yet extant or not, these doubts do not apply to the domestic hog. Its wild source still exists, and is universally

recognised; like the wolf, however, it has been expelled from our island, but, like the wolf, it roams through the vast wooded tracts of Europe and Asia. Whether the true wild horse exists in the deserts of Central Asia is yet a doubt, although we think it does. The fleet wild ass or onager is most probably the origin of our despised domestic beast; the paseng or ægagre of the mountains of Central Asia is generally regarded as the wild type of the goat; the wild buffalo still exists in India; the wild origins of the ox and the sheep, the dog and the cat, are obscure or unknown; the llama of the Andes is the tamed guanaco; but of its Asiatic ally, the camel, no wild type has been discovered; the wild hog is undoubtedly the parent of our domestic breed; of the elephant we need not speak—we have already demonstrated its real position. Such, then, is a summary review of our ordinary domestic quadrupeds, valued for their respective qualities and uses, as far at least as their wild types are concerned. Nevertheless, among those even whose origin is accredited (the llama perhaps excepted), not one affords such certain claims of primeval parentage from a wild stock still extant as the hog. But what is more, while the supposed or real wild stocks of all others of our domestic quadrupeds have their present localities or geographical boundaries very limited, the wild stock of the hog is most extensively spread throughout Europe and Asia, and has been known, described, and celebrated from the earliest ages, alike by sacred and classical writers; it is the *sus scrofa* of Linnæus, the *sus aper* of Brisson. Having thus glanced at the original type of the ordinary domestic hog, we may now direct our attention to the family group, of which it is the chief example; this family is termed *suidæ* (Gen. *sus*, Linn.; *Les cochons*, Cuv., *Regne Anim.*, vol. i., p. 243), and is regarded by Cuvier and some naturalists as leading through some *fossil* forms from the ordinary *pachydermata* to the *ruminantia*. Of these we may mention the *anoplotherium* and *ziphodon*, the remains of which are found in the gypsum quarries near Paris, and in other localities. In these animals the feet were cloven as in the deer, being divided into two toes, sheathed with hoof at the extremities; nevertheless, the metacarpal and the metatarsal bones are separate as in

* The horse and ass are *solidungulous Pachydermata*.

† All our ordinary domestic birds—as the fowl, the goose, the duck, the pigeon, &c.—are the descendants of a reclaimed stock; even so is the canary bird; but the eagles, falcons, and hawks, which the falconer employs, are all trained captives, and breed not in confinement.

the hog, and do not form a single canon-bone, as in all the ruminants (with, we believe, a single exception, the water musk-deer of South Africa).

The teeth of the *anoplotherium* are very remarkable, and very unlike those of ruminants; moreover, these extinct animals were low on the limbs (the *ziphodon* excepted), and were furnished with a long tail, compressed horizontally at the base, tending to prove their habits to have been in a great measure aquatic. Notwithstanding Cuvier's opinion, we cannot but hesitate to regard the *anoplotherium*, notwithstanding its bifid hoofs, as being an intermediate form. The dentition consists of six incisors in each jaw, two canines, and fourteen molars above and below, thus: incisors, 6; canines, 1—1; molars, 7—7. The teeth are arranged in an interrupted series, without any vacancy between the incisors and canines, or between the canines and the molars. The canines resemble the incisors in form, and do not overtop them, and the four posterior molars on each side resemble those of the *rhinoceros*, the *hyrax* or *daman*, and the fossil *palæotherium*.

On the other hand, whatever link in the chain the *anoplotherium* may have formed, it cannot be doubted that many fossil species are known which filled up the hiatus between the *rhinoceros* and the hog tribe. Of these we may mention the *anthracotherium* (Cuvier), the *hippohyus* (Cautley and Falconer), and the *cheropotamus* (Cuvier), which last appears to have closely resembled the peccaries of South America. Its remains are found in the gypsum quarries near Paris, and also occur in the Seafield eocene marl quarry near Ryde, in the Isle of Wight (the oldest of the tertiary system of deposits). "Hence," as Professor Owen observes, "it was the earliest form of the hog tribe introduced upon our planet." The *cheropotamus* unquestionably came within the pale of the *suidæ*.

In the Mosaic laws the swine is described as dividing the hoof, or as cloven-footed, yet not chewing the cud. If we except the peccaries, which have only three toes on the posterior limbs, there are in the hog tribe four toes on each foot—of these the two middle are large, and furnished with strong hoofs; the two lateral, furnished also with hoofs, are shorter, and scarcely if at all touch the ground. Viewed externally, it must be confessed that the feet of these animals closely resemble those of the ordinary ruminants, and may indeed be termed cloven; but when we examine the bones we discover a decided difference. If we look at the foot of the sheep, we shall find that the metacarpal bones of the fore limbs, and the metatarsal bones of the posterior limbs, are consolidated into a single elongated bone, called the canon-bone, with an articulating extremity like a double pulley, to which the two toes are attached,

and on which they work, so that the two toes of each limb have but a single metacarpal or metatarsal bone, common to both. In the sheep there are rudimentary lateral spurs or toes, clad with horn, but without any vestiges of metacarpal or metatarsal bones; nevertheless, in some ruminants the lateral spurs or toes are more developed, and the metacarpal and metatarsal bones, in the form of slender stylets, do exist; but these stylets never extend so far as to enter into the structure of the joint above (the carpo-metacarpal joint), as in the hog. Yet the fact of their existence is not to be passed over without consideration, evincing as it does a tendency, so to speak, of the feet of the hog tribe and of the ruminants to approximate, and thereby leading us to suspect that, as far at least as the feet are concerned, a series of intermediate forms may have intervened to complete the chain of conjunction, either on the one hand by the modification and decrement of the external toes, and metacarpal and metatarsal bones, of animals of the pachydermatous order, or by successive degrees of development of the same bones in ruminants. In the hog tribe every toe has its respective metacarpal or metatarsal bones, perfect as to form, but those of the lateral toes are small, bearing proportion to the diminutive size of the toes themselves. The external similarity of the feet of the hog to those of the ruminants, and at the same time their difference in structure, osteologically considered, did not escape the notice of Buffon, who thus expresses his doubts respecting the real affinities of this group of mammalia:—"These animals (swine) are alone; the species (and the observation is applicable to the hog tribe generally) is as it were unique—it is isolated; it appears to exist more unallied than any other—it is near no species which can be regarded as principal, or accessory, as, for example, the species of horse in relation to that of the ass, or the species of goat relatively to that of the sheep. It is not subject to so great a variety of races as is the dog. It partakes of many species, and yet differs essentially from them all. Let those who would reduce *nature* to trifling systems, who would enclose her immensity within the bounds of a formula, consider this animal with us, and see if it do not escape all their methods. In its limbs it has no resemblance to those which are termed *solipede*, because it has its foot divided; it does not resemble those which are called *cloven-footed*, because it has really, within, four toes, although two only appear externally; it does not resemble those which are termed *fissipede*, for it walks upon two toes only, and the others are neither developed nor placed like those of the *fissipede* animals, nor even so elongated as to be of any avail. It has these equivocal characters—characters ambiguous—of which some are apparent, others obscure. Must we say, then, that it is an

error of nature that these phalanges, these toes, which are not fairly developed externally, are not such as to warrant being taken into account? But this error is constant; besides, this animal does not resemble those with cloven feet, as respects the other bones of the foot; and it further differs by characters still more striking, for these have horns and want incisor teeth in the upper jaw; they have four stomachs—they ruminate. The hog has no horns; it has incisors in the upper as well as in the under jaw; its stomach is single; it does not ruminate; it is evident, then, that this animal is neither one of the *solipede* genus, nor of the *cloven-footed*; furthermore, it is not one of the *fissipede* tribe, since it differs from these animals not only in the structure of the termination of the limbs, but more particularly in the teeth, the stomach, the intestines, &c. All that can be said is, that in some respects it forms a blending passage between the *cloven-footed* and the *fissipede*. It differs, however, less from the *solipede* animals than from the rest, as regards the order and number of the teeth; it resembles them in the elongation of the jaws, and like them it has a single stomach, though of a much larger size. Yet, in the presence of an appendix to the stomach, as well as in the arrangement of the intestines, it seems to approach the *cloven-footed* or ruminant group." If Buffon had here extended his observations to the peccaries, the indigenous representatives of the hog in South America, he would have found a striking structural similarity in the bones of the feet to those of ruminants, inasmuch as the metacarpal and the metatarsal bones of the two large toes of each foot, respectively, are consolidated together into a sort of canon-bone; and, moreover, the stomach is divided into many sacculi. In the hog the cardiac portion of the stomach is carried out into a hood-like appendage, distinct from the cardiac cavity, by a marked fold or constriction. This hood, which gradually narrows to an obtuse point, is reflected over the dorsal face of the stomach, extending so much to the right as to pass beyond the middle of this viscus, and even cross the insertion of the œsophagus. Everywhere this reflected hood-like portion is closely attached to the posterior aspect of the stomach. The anterior portion of this viscus is convex, and divided into two swellings by two furrows—a left and a right, between which enters the œsophagus, nearly in the middle. The right swelling borders upon the pyloric portion, which is more ample than the cardiac. The left swelling, or projection, receives the œsophagus or gullet, and the epithelium or cuticular lining of this tube is continued to the right and left through a small extent of this cavity, terminating in strong transverse and mamellose projections, which gradually diminish and disappear. The reflected hood presents in-

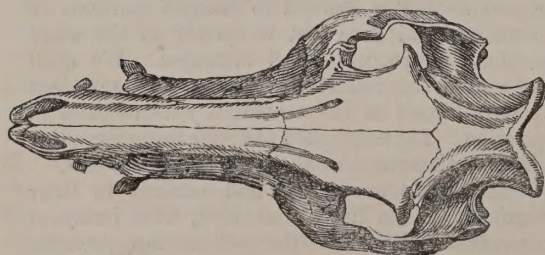
ternally numerous undulated folds. The pyloric orifice is furnished with a large elongated tubercle, which exactly fits the orifice like a cork; it acts as a valve, and is doubtless intended to obstruct the passage of aliment unfit to enter the duodenum. In the peccary the conformation of the stomach is still more complicated. The cul-de-sac of the cardiac portion is carried out into two long appendages, or horns—a right anterior horn, and a left posterior horn; the latter somewhat exceeds the former, it is obtuse and decidedly curved; the anterior horn is straight. The pyloric portion of the stomach is not only separated from the cardiac portion by a strong furrow or constriction, but is itself partially divided into two compartments, a circumstance which does not occur in the hog. The epithelium, continued from the gullet, is more extensive than in the hog; in fact, it lines the middle portion of the stomach, blending insensibly into the mucous membrane of the pylorus on the one side, and on the other terminating in a dentellated salient edge. Here, then, is something like a distant approach to the sacculated stomach of ruminants. It is a remarkable circumstance, moreover, that in one species of hog, the South-African wart-hog (*Phacochærus Ethiopicus*), the upper incisors are wanting as in ruminants; those of the lower jaw are six in number, but not visible; they do not protrude beyond the sockets, are buried by the gum, and soon lost; hence in adult individuals they are seldom to be found. This absence of upper incisors is a singular coincidence with the absence of these teeth in the ruminants, and might be insisted upon as one of many points proving the approximation of the two orders, viz.—the pachydermata and the ruminantia: not that such is our idea; we cannot but regard the ruminants as the most natural and clearly defined order of the mammalia. At the same time, we admit that, from among the pachydermata, various species may exhibit structural approximations to them, some in one way, some in another; nevertheless we cannot perceive that there is any blending or coalescing of forms together; there are no true definite palpable transition links between the two orders. The approximation is limited to isolated portions of structure, and then not uniformly to the same portion of structure in all instances. We shall not pursue this line of disquisition, it is sufficient to have hinted at the structural resemblances in question. Let us proceed to notice the outstanding characters common to the hog tribe in general.

The *suidæ* are robust and massive in their form, low on the limbs, flat-sided, with immense muscular development in the neck and fore-quarters. The head is wedge-shaped, with an elongated snout, terminating in a round or oval disc of cartilage, called in common language the button;

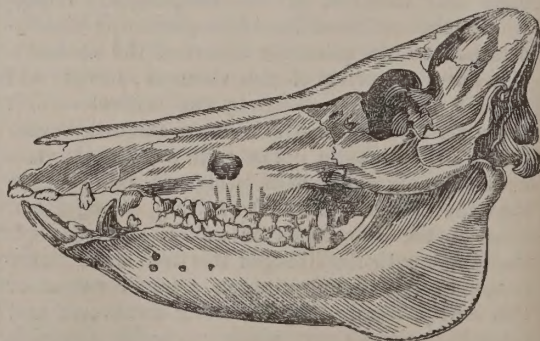
this disc is pierced by the nostrils, and possesses great power of mobility, being supplied by several strong muscles; it is, moreover, strengthened and supported by a small extra bone, as in the instance of the mole also, and is used with great facility as an instrument for ploughing up the ground in quest of roots for food. The lower jaw is deep and strong, and the symphysis of the chin is completely ossified, and not, as in ruminants, united by suture. The mouth is wide, opening to a degree almost unparalleled among terrestrial mammalia. The jaws are armed with tusks, which grow to a large size, pass from between the lips, and are weapons of tremendous effect; the tusks of the lower jaw advance before those of the upper, which turn obliquely upwards and outwards. In the peccaries the tusks are but little developed; in the male *babirusa* those of the upper jaw pierce through the skin of the snout, and are greatly elongated. The eyes are small, but quick and shrewd in their expression; the ears are moderate, erect, and pointed. The tongue is elongated and smooth. The tail is short, slender, and apparently of little utility. The senses of smell, sight, and taste are in high perfection, more especially that of smell, and the olfactory nerves are large. The sense of hearing is acute. In their diet the *suidæ* are omnivorous, vegetable and animal substances being equally acceptable; still it is on vegetable aliment that they chiefly feed. The skin is coarse, covered with bristles, and destitute, or nearly so, of the subcutaneous muscular expansion common to most other animals, termed the *panniculus carnosus*, and so highly developed in the hedgehog. On looking at the skull we find its base or occipital portion forming a right angle with the obliquely rising upper surface, and a bold transverse ridge is formed by the union of the occipital to the parietal bones, which latter advance above the frontal bones and form the most elevated portion of the skull. The nasal bones are prolonged to the end of the snout, and the symphysis of the lower jaw is consolidated. In proportion to the elevation of the occipital bone are the length and

strength of the spinous processes of the dorsal vertebræ. Those of the anterior dorsal vertebræ in particular are remarkable for their development, and indicate the volume of the muscles for supporting and moving the head. These are the agents by which the dreadful tusks are brought into play. Rushing on his antagonist, the boar strikes obliquely upwards, right and left, with irresistible violence, in a direction harmonizing with that of the tusks, and in the mode best suited for the exertion of the animal's strength. The neck is short, and with this shortness is necessarily connected that of the limbs, and especially of the anterior pair, otherwise the animal would not without difficulty reach the ground with its snout. Their strength must be in proportion to the weight to be sustained, and the weight depends upon the size of the head and the muscular development of the neck and shoulders.

"When," says Sir Charles Bell, "we look upon the boar's head, we comprehend something of his habits, and see what must be the direction of his strength. He feeds by digging up roots, and the instruments by which he does this are also those of his defence. The position of the tusk defends the eye in rushing through the underwood; and the formation of the skull, and the spine, and the mass of muscle in the neck, all show the intention that he shall drive onward with his whole weight and strength, so that he may rend with his tusks. Accordingly we see that the back part of the skull rises in remarkable spines or ridges for the attachment of muscles, and that corresponding with these the spinous processes of the vertebræ of the back are of extraordinary length and strength. These processes distinctly indicate the power of the muscles which pass from the neck to the head. We now understand the reason of the shortness and inflexibility of the neck; because the power of the shoulders is directed to the head, and we may say to these large tusks. An elongated and flexible neck would have rendered these provisions useless. The characteristic form of the wild-boar then consists in the shortness and thickness of the



SKULL OF HOG SEEN FROM ABOVE.



SKULL OF HOG SEEN IN PROFILE.

neck, the wedge-shape of the head, the projection of the tusk, and the shortness of the fore-legs, which must always be in proportion to the neck."—*Bell on the Hand.*

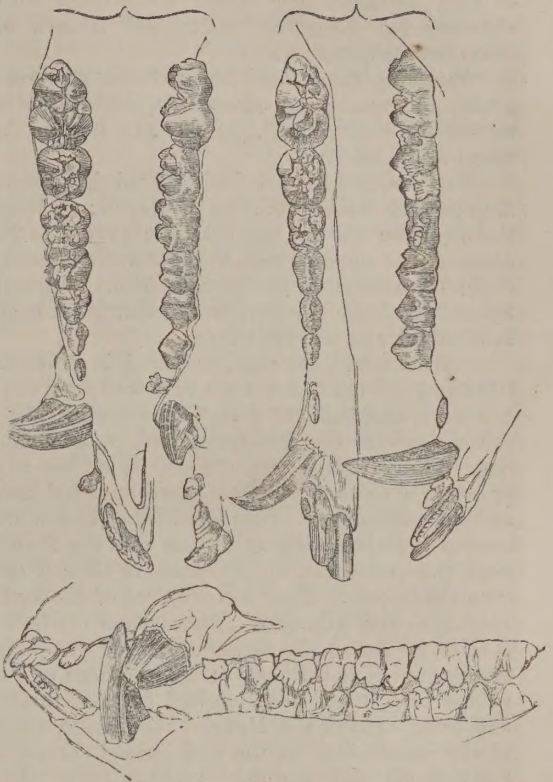
In the hog the two frontal and two parietal bones, at first distinct, unite early together. The temporal fossa is deep and bounded above by an acute ridge; it gives lodgment to the temporal muscle. The zygomatic arch is bold and strong. The area of the cerebral cavity is only half that of the cranium as it appears externally, so much is its volume augmented by the extensive frontal sinuses, which are carried even to the occiput.

The existing *suidæ* are resolvable into several distinct genera, of which one genus is peculiar to South America, the others belong to the older continents and the adjacent islands. The genera in question are, *Sus*, Linn.; *Babirussa*, F. Cuvier (*babi*, in Malay, a hog, *rusa*, a stag); *Phacochoerus*, F. Cuvier (*φακος*, a wart, and *χοίρος*, a hog); and *Dicotyles*, Cuvier (*dis*, double, *κοτυλη*, a pit, dimple, or navel).

GENUS *SUS*.

Dentition.—*Upper jaw*—Incisors six. Of these the two middle are the largest, and incline obliquely towards each other; the next incisor on each side leans towards its predecessor, and is flattened and trenchant, with a notched edge. The next on each side is a little removed from the others, and is small. In the milk teeth the second pair are larger than the first. After an interval succeed the canines on each side, commonly called tusks; they are prismatic, pointed, and curved with a sudden sweep, the socket standing out from the line of the other teeth and being rather averted. Their anterior aspect is worn by the action of the huge canines of the lower jaw. The molars are seven on each side. The first is small, simple, compressed, and removed from the succeeding one; it is often lost; the next three gradually increase in size and are compressed; the next three (true molars) also gradually increase in size, their crowns are furnished with obtusely pointed tubercles; the last molar is longer than broad.

Lower jaw—Incisors long, cylindrical, blunt at the point, advancing obliquely forwards so that they almost form a right angle with those of the upper jaw, which they do not meet directly, point opposed to point, but with an oblique bearing. The canines are very large and strong, and advance before those of the upper jaw, against which they wear. These tusks grow, if not during life, to an advanced period of existence; they sometimes attain to the length of eight or ten inches, and are most formidable weapons. In the female, the tusks are comparatively small. The molars are seven on each side in number, and resemble in character those of the upper jaw.



TEETH OF HOG.

The species of the restricted genus *sus* are more numerous than has been hitherto supposed; recent researches and examinations have demonstrated the distinctness of many which had previously been confounded together and regarded as identical with the ordinary wild boar (*Sus scrofa*, Linn.; *Sus aper*, Buff.) We may here refer to Müller's work on the *Zoology of Borneo* (Leyden, 1839), to Smuts (*Mamm. Cap.*), to Wagner in the *Munich Transactions*, vol. ix., to Schreber (*Säugethier, Suppl.*, iv.), and to other zoologists who have greatly added to our information respecting the present group. Many of the species are admirably figured by Müller, and comparative views of their skulls are given.

The following species appear to be determined:

1. THE COMMON WILD HOG (*Sus Scrofa*). *Le Sanglier* of the French; *Le Marcassin*, while young; *La Laie*, female.—This species, once common in our island, attains to a large size; its snout is thick and elongated; and its general form is massive and robust. The ears are moderate and erect. A fine specimen in the British Museum is thickly covered with coarse bristles of a grizzled black colour; the back of the neck and spine are maned with longer bristles, and the cheeks are bearded with bushy dark-black whiskers

of long bristles. The young are marked with alternate but irregular longitudinal ribands of brown and yellowish white.

According to Cuvier (*Lçons d'Anatomie comparée*), the number of vertebræ in this species is as follows:—cervical 9, dorsal 14, lumbar 5, sacral 4, caudal 20.

The wild hog is extensively spread throughout Europe and Asia, extending to Japan: at least the Japanese species has not been proved to be distinct. It appears also to inhabit the Atlantic chain of mountains in North Africa. Colonel Sykes regards the *Dookur*, or Dukhun Wild Hog, as identical with the *sus scrofa*.

"Wild hogs," he says, "abound in Dukhun (Deccan), and the males attain to a very great size. I am not satisfied that there is any specific difference between the European and Asiatic wild hog. Every village abounds with hogs, but any property in them is equally abjured by individuals and the community. They live in the streets, are the public scavengers, and dispute with the Pariah dogs the possession of offal matters thrown out from the houses. They certainly are of the same species as the wild hog. The flesh of the latter is eaten by almost all castes of Hindoos excepting the Brahmins and Buneas; but the flesh of the village hog is not even touched by the carrion-devouring outcast, the Mahr. The village hog is of the same colour as the wild animal, mostly a rusty black, and the only variations are slate black, or slate intense brown; but it is not above two-thirds of the size of the latter. Tail never curled or spirally twisted."—*Catalogue of Mammalia observed in Dukhun*.

According to Mr. McClelland the common wild hog exists in Assam. "The size to which the wild boar attains in Assam may be conceived from one of the skulls of the animal in my collection, containing a tusk which measures in length twelve inches."—*McClelland's MS. Proceedings Zool. Soc.* 1839, p. 150.

We here forbear to enter into a history of the wild hog, reserving our details until we come to the consideration of the domestic breed which has descended from it. Our principal object, at present, is to give a clear view of the various species as now established. At the same time, while we omit for the present farther notice of the *sus scrofa*, we shall not so closely bind ourselves with respect to other species, and this the rather as we shall not be necessitated to intermix their history hereafter with that of the species to which our chief attention is necessarily called in the work before us. We might indeed, without much blame, pass over all the species excepting that from which our domestic stock is derived, but in so doing we should, in our own estimation, commit an egregious error, and for the following reasons:—First,

we are not certain that every domesticated breed of hog is derived from one and the same source, consequently no wild species should be disregarded. Secondly, a professed work on the domestic hog would not only lose much interest, but much intrinsic value, were it divested of that information, relative to the tribe, which has been the result of modern researches. And, thirdly, no monograph of the *suidæ* has yet appeared in an English form. It is by diligence only that, from the writings of various foreign travellers and zoologists, as Boie, Müller, Wagner, Schreber, and others, we are enabled to lay before our readers a more distinct and clear view of this long neglected group, than has yet appeared in a popular form. By the kindness of the officers of the British Museum (and we thank Mr. Gray and Mr. Waterhouse), the specimens of the *suidæ* there preserved, both extant and fossil, have been unreservedly submitted to our inspection; while works and splendid engravings, little known to the public, have been brought forward to aid us in our researches. To neglect such advantages would be worse than error.

2. THE CRESTED WILD HOG (*Sus cristatus*, Wagner in the *Munich Transactions*, ix. p. 535; and in Schreber's *Säugeth. Suppl.*, iv. p. 297).

This species is a native of Southern India, and is less than the European wild hog in size. It is of a yellowish brown intermixed with black, passing on the under parts into dirty white. A distinct beard or tuft of bristles occupies the cheeks; and the bristles of the forehead, top of the head, and back are elongated, so as to constitute a sort of mane. Wagner observes that this species is peculiar to "*Fore-India*," and that the "*Hinder-Indian*" wild hog is as yet undetermined. As we have already observed, Colonel Sykes considers the wild hog of Dukhun to be identical with the common species, as Mr. McClelland does that of Assam.

3. THE BEARDED WILD HOG (*Sus barbatus*, Müller in *Vander Hoeven's Tydschr.*, v., p. 149, and *Verhandel*, p. 42, tab. 30). *Babi-utan* of the Malays.

The bearded wild hog is a very well marked species, which appears to be peculiar to Borneo. The upper part of the body is dusky ochre yellow; the sides and under parts have black bristles, intermixed with those of a lighter colour; the feet are dusky black; the top and back of the head are covered with smooth hairs; but the sides of the head, the lower jaw, and the cheeks to the ears, are covered by a rough curly beard, giving to the animal a singular appearance. This species is liable to some variation of colour. Captain the Hon. H. Keppel, R.N., speaking of the wild hog of Borneo (*Expedition to Borneo of Her Majesty's ship Dido, with Extracts from the Journal of J.*

Brooke, Esq., 1846), says, "the jaws are long, and the tusks also, and as sharp as a razor; and when once wounded the animals evince a strong inclination to return the compliment. They are active, cunning, and very fast." Mr. Brooke describes these wild hogs as dirty white, with a black head, but observes that he saw several young wild pigs black. In another place Mr. Brooke says, "We left Tungong—we saw many wild hogs, and on one occasion I was able to get within twenty yards of some ten of them together amongst some large drift-wood, on the beach of the Sampudian river. Just as I was crawling over a tree, and balancing, I found myself confronted by these animals, but they were out of sight almost before I could cock my gun and fire. They were of a large size, and most of them we saw during the evening were either dirty white or white and black."

4. THE WARTED WILD HOG (*Sus verrucosus*, Müller, *Verhandel*, i., p. 42, tab. 28).—The colour of this species is dusky brown, paler on the under parts; a short tufted beard occupies the cheeks; a warty protuberance is placed below the eye; the tail is curly. This species is a native of Java, but a blacker variety, regarded by Müller as distinct, is found in the Celebes Islands. It is termed by Müller *Sus Celebensis* (*Verhandel*, tab. 28 bis).

5. THE BANDED WILD HOG (*Sus vittatus*, Müller, *Verhand.*, i., p. 42, tab. 29).—General colour blackish brown; a whitish transverse bar crosses the top of the snout, and spreading over the cheeks in a wing-like form, extends to the sides of the throat. This species is a native of Java, Sumatra, and Banca. A smaller variety (*Sus Timoriensis*, Müller, l. c., p. 42, tab. 31, fig. 1-3) inhabits Timor.

6. THE PAPUAN WILD HOG (*Sus Papuensis*, Less. and Garn., *Zool. de la Coquille*).—This species, the *Béne* of the Papuans, is thus described by Lesson:—"This new species, which we have figured in plate viii. of our atlas, is remarkable for its small size, and its light and agreeable contour. The canines of the upper jaw are very small, and almost of the same form as the incisors. The bristles are tolerably thick, yellow and brown below, white above, and ringed with black. The tail is very short. The young are of a brown colour, more or less intense, and have on the back five stripes of a clear yellow. The length of this species is three feet. It is common in the forests of New Guinea. The Papuans esteem its flesh (which we found excellent), and catch the young ones in the woods, in order to rear them in a state of partial domestication. The *Sus Papuensis* exhibits many points of analogy with the peccaries, and seems to be intermediate between them and the hogs. The individual which we have described

presented only thirty-six teeth: perhaps there were four molars yet to be developed, which would bring them to forty, the total number."—Lesson, *Manuel de Zoologie*.

7. THE MASKED WILD HOG (*Sus larvatus*, F. Cuvier; Smuts, *Mamm. Cap.*, p. 59; *Sus Africanus*, Schreb., tab. 327; *Sanglier de Madagascar*, Daubenton; *Bosch-vark* or wood-swine of the Dutch; *Choiropotamus Africanus* in Catal. of Mamm. in the British Museum.

This savage and formidable species is a native of the eastern districts of Southern Africa, and also, it is said, of Madagascar. The aspect is singular and repulsive, owing to a huge protuberance on each side of the head, crowned with a pendent warty mass, concealing the lower part of the face. Two other separate and smaller tubercles are placed above this mask, immediately beneath the eyes. In this species, the zygomatic arches extend more outwards, and take a more horizontal direction than in the common wild boar; and a great elevated apophysis rises above the alveolus of the upper canine tooth, ascends obliquely, and terminates by a large rough tubercle. It is to these osseous prominences that the huge warts or mammiform excrescences, which give this animal so hideous an aspect, adhere. In general contour, the masked wild hog resembles the ordinary species; its neck, however, is shorter, and its snout broader, and its head is altogether larger in proportion. Prompt and vicious, this animal is much to be dreaded in close combat; its great strength, and the size of its tusks, render it a match for the most daring enemy. Like its European relative, however, it does not begin the assault; it does not seek the contest, but it does not decline it. It is said to dwell in excavations in the ground, whence it rushes out on its assailants.

We are informed by Dr. Smith that this species is subject to great variety of colour, scarcely any two specimens being precisely alike. Some are of a brownish black variegated with white, and others are of an almost uniform light reddish brown, or rufous without any white markings, and it is scarcely possible to say which is the most prevailing style of colouring. The bristles are long, particularly upon the upper parts of the neck and back; the canines are very strong; the ears are short, and thinly covered without and within with coarse black hair, which is longest at the tips. The tail is thinly covered with black bristles. Average length of the body, between four and five feet; of the tail, one foot.

Of two specimens in the British Museum, one (that of a young animal) is sandy-red, with cheek-tufts; another (apparently that of an adult) is of a grizzled black, with white linear cheek-tufts; the eyes are encircled by white, and a black triangular patch is above each cheek-tuft. It is, we consider,

of this species, and not of the *phacochoerus*, that Sparrman gives some interesting details; and the following description, we think, proves it:—"The tail is flattened at the tip, and this appendage they never fail, either old or young, to hold quite erect in the air during the whole time they are pursued. With respect to taste, I found the flesh very much to resemble that of the ordinary pig. I never observed the animals to be of that dark hue ascribed to them by M. Pallas, and which M. Vosmaer has given them in the coloured figures he has published, those that I saw being of a bright yellow colour, like the greatest part of our domestic swine. Neither did I hear any body in the colony call them *haartloopers*, as M. Vosmaer pretends they are termed; though, on the other hand, I have frequently heard the Hottentots call them *kaunaba*, and have likewise been informed by the same people that these creatures are fond of walking in the mire, and are wont to grub after the root of a shrub of the *mesembryanthemum* kind, which they call *da-t-kai*." The animals noticed by Pallas and Vosmaer were doubtless the *vlacke-vark* or black hog (*phacochoerus*) and not the *bosch-vark*, of which Sparrman saw only yellow or sandy-rufous varieties, and of the existence of which only he appears to have been aware, consequently the observations he makes respecting the details given by Pallas and Vosmaer (and which details refer to the *vlacke-vark* or *phacochoerus*) are altogether foreign to the matter.

The masked wild hog, or *bosch-vark*, is to a certain extent gregarious; at least, the females with their young associate together for mutual defence, as is the case with the ordinary wild swine of Europe. Sparrman (*Travels*, English translation) says, "This day I saw for the first time a herd of *bosch-varkens*, or, as they are likewise called, *wilde-varkens* (wood-swine or wild swine), in their wild uncultivated state; for I had seen only one of this species of animals in the menagerie of the Cape. He was confined there with a strong iron chain, and was very wild and vicious. . . . In a head of this animal, salted and dried, which I gave to the Royal Academy of Sciences in Sweden, the upper tusks stand nine inches out of the jaws, and measure full five inches in circumference at the base. The two other tusks, which come from the lower jaw, project but three inches from the mouth, being flat on the inside, and corresponding with another plain surface similar to it on the upper tusks. These the beasts make use of, not so much for biting, as for goring and butting with. A little pig of this species, which I afterwards caught at Fish River and had tied up, thinking to bring it alive along with me, had already got this trick, so that I was soon obliged to let it be killed. It was terribly vicious, and quick in all its motions, and though at that time not absolutely dangerous, yet

my boschmen were very much afraid of it. We had rather, said they, attack a lion on the plain than an African wild boar; for this, though much smaller, comes rushing on a man as swift as an arrow, and throwing him down, snaps his legs in two, or rips up his belly, before he can get to strike it and kill it with his javelin. . . . The dwelling-place of this same species of wild boar, to which the avenues seemed to be very narrow, is underground. I have been told, indeed, that the *bosch-varkens* go down into them backwards and place themselves in a row, one behind the other; but this is not very likely, for probably these passages are widened lower down. Thus much, however, is certain, that people dare not attack them in their holes, for fear of their coming out upon them on a sudden. The body of this animal is small in comparison with its head, a conformation which facilitates its burrowing and living underground.

"It would not be adviseable for a man on horseback to approach too near, or to hunt this animal, as it will often turn round on a sudden, and striking with its tusks at the horse's legs, afterwards kill both him and his rider.

"This day I pursued several young pigs with the old sows with a view to shoot one of them, but in vain; nevertheless, the chase of them afforded me peculiar pleasure. On a sudden the heads of the old ones, which before were of a tolerable size, seemed to have grown still larger and more shapeless than they were before, which wonderful and momentary change astonished me so much the more, as my hard riding over a country full of bushes and pits had hitherto prevented me from giving sufficient attention to the manner in which it was brought about. The secret, however, consisted in this; each of the old ones while they were making off took a pig in its mouth, a circumstance that also explained to me another subject of my surprise, namely, that all the pigs (young) which I was just before chasing along with the old ones vanished all on a sudden. In this action we find a kind of unanimity among the wood-swine, in which they resemble the tame species, and which they have in a greater degree than many other animals. It is very astonishing that the pigs should be carried about in this manner, between such large tusks as those of their mothers, without being hurt, or crying out in the least. I saw the same done on two other occasions as I was chasing them. The cry of the young is like that of our common pigs, as I found by some we afterwards caught."

Whether this species will breed with the common swine (and the same observation applies to the preceding species, the *sus scrofa* excepted) remains to be proved. Sparrman indeed informs us that he heard of a farmer in South Africa who

had a brood between the wood-swine and the ordinary race, but he does not vouch for the accuracy of the statement.

Occasionally it would appear that these wood-swine are caught and rendered tame. The same traveller thus writes:—"I observed a peculiar circumstance on my return home through *Lange Kloof*, which was that two tame pigs (young wood-swine), at a farmer's in that province, not only went down on their knees to graze, but even successively changed their posture to that of standing with the greatest ease. This faculty the animal seems to have acquired in its subterranean caverns, and it proceeds from the creature's neck being too short to be conveniently lowered to the ground." Most probably, as it uses its mouth in digging, it requires full play in order to bring the tusks into efficient action; but, that the animal acquires this faculty from its habit of living in burrows is an idea unworthy of the slightest entertainment. The *phacochoerus* is also in the habit of kneeling, and we have frequently seen the common domestic hog do the same.

The masked hog has by many authors been confounded with the *phacochoerus*; both have hideous heads and wrinkled fleshy lobes on the cheeks, and perhaps their general habits are the same, but the dentition of *phacochoerus* is very different and peculiar, and the protuberances on the face are not similar in situation.

8. *SUS FASCIATUS*.—In the British Museum is the specimen of a very young wild hog, differing in its markings from the young of the common wild hog, or, as far as can be at present ascertained, of any other species. It is striped, and has a dark mark along the neck and over the withers. In the catalogue of the mammalia of the British Museum it is termed (provisionally we suppose) *sus fasciatus*, but granting it the representative of a distinct species, how far the term *fasciatus* will apply to the adult is very doubtful. The country whence the specimen in question came is unknown.

GENUS BABIRUSSA.

The genus *babirusa*, F. Cuv.; *porcus*, Wagler; though allied to *sus*, is distinguished by certain peculiarities, one of which is the upward direction of the alveoli of the upper tusks or canine teeth; these tusks in the male are enormously developed as to length, and are extraordinary both in their form and position. They do not pass out between the lips as in the hog, but cut through the skin of the snout, so as to appear like horns growing in an unusual situation. Instead of being stout and strong they are slender, and rising vertically curve backwards with a slight indication outwards, so as to form part of a circle, and often touch the skin of the forehead. The tusks of the lower jaw are sharp and powerful, and emerge from between the

lips; they bend upwards and outwards, and are sufficiently formidable weapons. The upper tusks are wanting in the female, and the lower are small. The incisors are four in number in each jaw. The molars are five on each side, above and below. The first upper molar on each side is a false molar, and the first two below on each side have the same character; so that the dental formula will stand thus:—

$$\begin{array}{l} \text{Incisors } \frac{4}{4}, \text{ canines } \frac{1-1}{1-1} \text{ male, false molars} \\ \frac{1-1}{2-2}, \text{ true molars } \frac{4-4}{3-3} = 34 \end{array}$$



DENTITION OF BABIRUSSA.

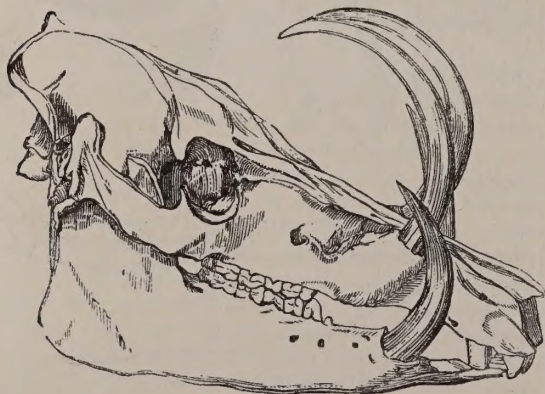
1. The *Babirusa Alfurus*, Lesson; *Porcus Babirusa*, Wagner, Schreb., *Säugeth. Supp.* iv., p. 301; *Sus Babirusa*, Linn., Desmarest, and others; *Le Babyroussa*, Buffon; *Le Sanglier des Indes Orientales*, Brisson.

The *babirusa* is the only known species of the present genus, and though limited in its *habitat* to the Moluccas and a few other islands of the Indian Archipelago, was apparently known to the ancients. Desmarest regards it as the *ὄς τετρακερως* or four-horned hog of Ælian. We may add that the term swine-deer (*χοιρελαφος*) was used by Cosmas, a writer in the sixth century, as the designation of an animal from India; and, as the meaning of the term coincides with the character of Pliny's

horned boar, we have some grounds for suspecting that this animal was the species intended by each.

Piso, in his edition of the *Natural and Medical History of the East Indies*, by Bontius, remarks that sedulous as Bontius was, he had made no mention of this animal. Piso, however, supplies the deficiency, and gives in the page no very bad figures of the animal and its skull. In the frontispiece, however, where the *babirusa* occupies a conspicuous place on the foreground, the painter has evidently had the hog-deer* in his mind, and has taken a few liberties with the animal's muzzle, aspect, and bearing (though the tusks are tolerably correct), lengthening its neck not a little. The Indians, Piso tells us, ascribe these animals to a union of the hog and the deer. He says they are only found in the island of Booro, thirty miles distant from Amboyna, and adds that the *babirusa* is swift and fierce, and that its flesh is highly prized both by natives and foreigners.

Specimens of the *babirusa* are rare in the museums, and still more rare are living animals in the menageries of Europe. Skulls indeed of the animal are often imported into our country, brought over by vessels trading among the Moluccas, or touching at Java and Sumatra, and of these our museums possess numerous specimens.



SKULL OF BABIRUSSA.

The few opportunities which have thus been afforded to zoologists have rendered their descriptions of this animal, until within the last few years, more or less erroneous or defective. For example, in Shaw's *General Zoology* (1801), the *babirusa* is described as being covered not by bristles, but by a fine, short, and somewhat woolly hair of a deep brown or blackish colour, interspersed with a few bristles on the upper and hinder part of the back. In a preserved specimen which we had the opportunity some years since of examining, we found that the skin, which was black and

granulated, was almost utterly destitute of covering, being sparingly beset with very short bristly hairs, not very perceptible even to a bystander, unless he took the trouble to make a somewhat close examination. The skin, moreover, exhibited traces of wrinkles or furrows; the specimen was that of an adult individual. Lesson, who informs us that he examined many specimens at Sourabaya, in the island of Java, describes the skin as hard, black, wrinkled, or furrowed, and furnished only with a few scattered hairs; but he says that the general contour of the body is robust and massive, and that the limbs are thick, whereas the specimen in question (making every allowance for the shrinking of the skin while in the process of curing) appeared to differ from the hog in being less heavily built, in having the head narrower and more acute, and in the limbs being comparatively longer and more slender. Perhaps Lesson took the Papuan hog as his model of comparison. The tail was of moderate length, and tapered to a slender point, and the ears were short, erect, and pointed. Still more recently a young male *babirusa*, living in the gardens of the Zoological Society, came under our notice, and enabled us to form a more precise and correct idea of the animal than even the best preserved specimen could afford. The following are the observations we made:—"This animal is hog-like in figure, and much resembles a small pig of the Chinese breed. It is roundly formed, like a young well-bred hog, and the skin lies close, giving a compactness to its appearance. The head is small, and high between the ears; the snout is elongated; the ears are small, erect, and pointed; the eyes in their form and expression are more deer-like than pig-like; the iris is brown; the skin, which is thinly clothed with short black bristly hairs, is everywhere dotted with small granulations, which spread and become rougher, coarser, and more decided about the limbs and feet, and especially on the anterior part of the head, the sides of the face, and the under jaw. Closely as the skin lies, it becomes thrown into a series of regular and prettily-arranged wrinkles, or furrows, with the different movements of the body, and varying in direction accordingly. As the animal turns to one side these furrows are transverse; in other attitudes they become more or less oblique; but none are to be seen when the animal stands still, or lies quietly on its straw. The tail is moderate, slender, and tapering; the limbs are well proportioned, rather slender, but not much longer in relation to the size of the body than in the hog. The tusks of the upper jaw in the present individual are as yet small, but are at the same time curved backwards.

"In its state of captivity, this young *babirusa* seems as contented as a pig in its sty; it is not only quiet, but disposed to familiarity, raising

* *Cervus Porcinus*, Zimm. It is a native of India.

itself up on its hind legs and putting its snout to the wooden bars of its pen or enclosure, evidently soliciting food. It turns the straw over and over with its snout, and champs in eating, but utters, as far as we could learn, no grunt, as does the hog, nor has it the unpleasant smell of the latter.

Lesson describes the *babirusa* as restless and fierce in confinement; but this individual is perfectly gentle and contented. It is very fond of burying itself beneath the straw, and it generally reposes thus covered over and concealed. It is partial to Indian corn."



BABIRUSSA.

A male and female *babirusa*, brought to France by the Astrolabe, lived for about three years in the menagerie of Paris. Very good figures and a lively description of these individuals have been given by M. F. Cuvier. The female was much younger and more active than the male, which was aged, very fat, and very indolent, spending his life in eating, drinking, and sleeping. The female bred once after her arrival in Europe. When the male retired to rest, she would cover him completely over with litter, and then creep under the straw to him, so that both were concealed from sight. They died of diseased lungs about three years after their arrival.

The *babirusa* is found in the marshy forests of Booro, and other of the Molucca Islands, as Amboyna, &c., and also in Java, where it associates in troops. It is said to feed principally upon maize, and is partial to the water, swimming with the greatest ease, and often crossing narrow straits without difficulty. The female is considerably inferior to the male in size.

With respect to the utility of the upper curled tusks in the male—which, from their situation and figure, cannot be employed as weapons—much has been said. It has passed current, on insufficient authority, that they serve the animal as hooks, by

means of which, when applied to some low branch, it supports its head while reposing in the dense forest—an explanation evidently suggested by their hook-like shape, and not deduced from personal observation; for when, as is often the case, the curling tusks press on the forehead, how is it then possible for the animal to hook them on a branch, unless it be so aptly placed and formed as to allow of being threaded through them? This use of the upper tusks as hooks appears first to have been suggested by Valentyn in his notice of the animal in his *History of the East Indies*; and it was from a translation of this which fell into Pennant's hands that, as he himself informs us, he borrowed the following succinct description, in which this strange use of the tusks is detailed. The passage is as follows:—"Inhabits Booro, a small isle near Amboyna, but neither the continent of Asia nor Africa. What M. Buffon takes for it (in Africa, we suppose) is the Æthiopian boar. They are sometimes kept tame in the Indian Isles, live in herds, have a very quick scent, feed on herbs and leaves of trees, and never ravage gardens like other swine. Their flesh is well-tasted. When pursued and driven to extremities, rush into the sea, swim very well, and often dive. In the forest, often rest their head by hooking their upper

tusks on some bough. The tusks, from their form, are useless in fight." Why, we may ask, should not the females be enabled to hook up their heads as well as the males? But we need not insist upon the fallacy of this statement.

It has been conjectured that the use of these tusks may consist in protecting the head and the eyes of the animal as it urges its way through dense jungle; but again, it may be asked, why should not the female be similarly defended? We cannot admit the correctness of this conjecture. We regard them as sexual characteristics peculiar to the male, and in the same light as we do the tusks of the horse which are wanting in the mare. In many animals indeed, as we well know, the male is endowed with organs for which no definite use can be assigned, and which are wanting in the female. Such are the huge callosities on the cheeks of the male orang-outang of Borneo. In many instances the males are armed with weapons which are wanting in the female, as among the deer tribe; but these recurved tusks are not weapons, and cannot be used as such. It is, however, possible that the germs of these tusks may be undeveloped in a small alveolar cavity in the skull of the female *babirussa*. If so, that their development in the male to so great an extent should occur as a sexual characteristic is only in accordance with a very general law. In the female swine, the tusks, which are truly weapons, are far less developed than in the boar.

GENUS PHACOCÆRUS.

In general form, aspect, and manners, the animals contained in this genus resemble the hog, and were it not that they exhibit characters in their dentition differing from those of the genus *sus*, they could not, on any feasible grounds, be removed from it. These characters, however, are decisive.

The molars, instead of presenting the ordinary structure as in the hog tribe generally, approximate to that displayed by the molars of the elephant, being composed of vertical cylinders of enamel, enclosing an osseous deposit, and compacted together by *crusta petrosa*. Nor is this all; they are for a long time destitute of true roots, and therefore continue to grow, advancing in rotation from behind forwards, as in the elephant, the posterior by their development and advance conducing to the expulsion or loss of the anterior. Hence they apparently vary in number. Some writers, as Desmarest, count five on each side above, and four below. Others enumerate only three on each side, above and below. In the skull of the Abyssinian species (*Phacochærus Æliani*), which we examined, we found four molars on each side above, and three below. The first molar above was very minute; the next two were larger, the

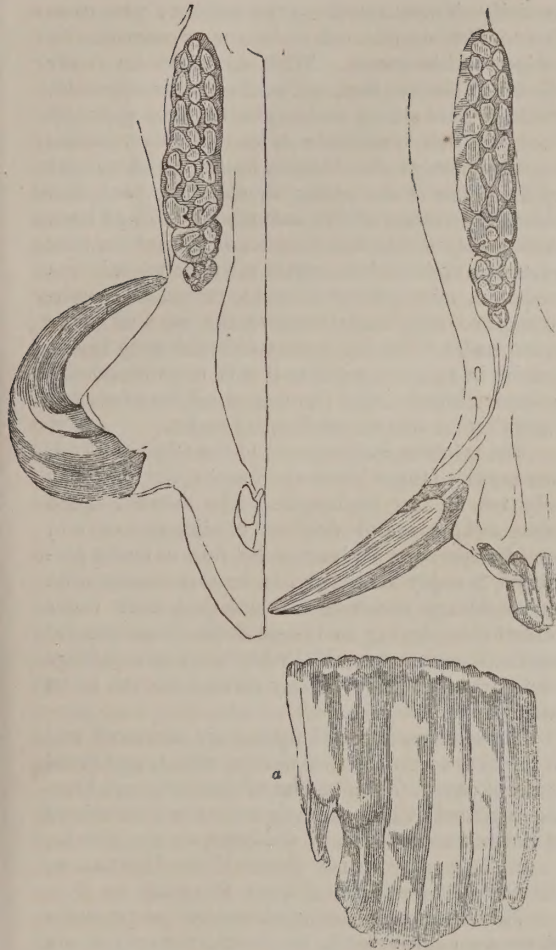
increase of size being gradual; but the fourth molar was very long, and narrowed gradually as it proceeded backwards. In the under jaw, the first two molars were small; the third and last extremely long. As age advances, the smaller anterior molars on both jaws gradually disappear, in consequence of the advance of the last. The anterior molars, it may be observed, are shaped like other molar teeth, and nourished in the same manner. They have enamelled crowns and true roots. These must die and decay when they have attained their utmost growth, or loosen and fall out, as the alveoli become filled with bony substance; but it is altogether different with the last compound molar tooth, which rises gradually, and recalls to mind the mode of growth, as well as of structure, in the molars of the elephant. The last molar presents three rows of tubercles, disposed longitudinally; those on the edges are placed opposite to each other, and those in the middle are intermediate to the first. When these tubercles begin to be worn, they present so many discs of enamel, and form as it were three chains of rings; and when the effects of mastication extend farther, these rings and these discs enlarge, and become more or less irregular. Those on one side unite with those on the other, whilst those in the middle are more or less obliterated. It is always anteriorly that these teeth are first worn; because there they first begin to rise from the alveolus, pushing before the first molars. They are, moreover, a long time without taking root, and it is only when they cease to push forward, which does not occur till very late, that they terminate in more or less elongated cones, enveloping at their base the dentary capsule, which then divides, and ceases to form a single organ.

The canines or tusks of the upper jaw are enormous, and turn upwards, their anterior face being worn by the canines of the lower jaw.

The incisors vary. In one species (*Phacochærus Æthiopicus*) there are none in either jaw; at least, if any exist in the lower jaw during life, they are not visible, being very minute, and buried in their alveoli beneath the gum. This is only in young animals; for as age advances they disappear.

In the other species from Abyssinia (*Phacochærus Æliani*), there are two well-developed incisors above, and six below, of considerable size, and projecting forward. The two central incisors are larger than the lateral. Our illustration shows the upper jaw of *Phacochærus Æthiopicus*, the lower jaw of *Phacochærus Æliani*, and a last molar tooth, viewed sideways.

The other characters of the present genus are as follows:—Eyes small, but little separated from each other, and high on the forehead; muzzle broad; a coarse cartilaginous wart-like excrescence on each cheek below the eye, and a smaller excrescence



TEETH OF PHACOCHERUS.

a Last molar tooth.

on each side of the muzzle, between the eye and the tusks; cheeks swollen from the enormous development of the base of the zygomatic arches; and the alveoli of the upper canines form a projection on each side of the muzzle; ears erect and sharp at the apex; the additional muzzle-bone, single in the hog, is double; neck short and maned, as is the ridge of the back. Locality, Africa.

1. The SOUTH AFRICAN WART-HOG (*Phacochoerus Æthiopicus*; *Sus Æthiopicus*, Linn.; *Phacochoerus Africanus*, Desm.; *Aper Æthiopicus*, Pall., Misc., p. 16, t. 2; *Æthiopian Hog*, Pennant; *South African Phacochoere* of some writers; *Vlacke-vark* of the Cape colonists; and *Engallo* of the natives in Guinea).—The distinguishing characters of this species may be summed up as follows:—Incisors above, none; below, none, or six most minute, hidden beneath the gum, and deciduous; head, short; chaffron, convex. The range of the vlacke-vark, engallo, or South African wart-hog,

does not appear to be precisely determined. Formerly it existed within the limits of the Cape colony, and still lingers on the frontier districts. If the species be the same, and not *Phacochoerus Æliani*, it inhabits Guinea, Cape Verd, and the country of Senegal; but we suspect, from Cuvier's description of the Cape Verd animal, viz. the possession of lower incisors and a more elongated form of the head than in individuals from South Africa, that it is identical with the Abyssinian species; and, if so, the habitat of the latter extends through Central Africa from Abyssinia to Senegal and Guinea. Gmelin termed the Cape Verd animal *Sus Africanus*, and the South African animal *Sus Æthiopicus*. Now, if the Cape Verd wart-hog and the Abyssinian one are identical, as we suspect, the term *Æliani* must be exchanged for *Africanus*, and the latter term will merge from being a synonym into its original value. It may be, however, that there are three distinct species.

Dr. Smith, in his *African Zoology*, thus describes the South African species:—"Top of the head, the upper part of the neck, and the anterior part of the back, covered with very long and rigid bristles of a black-brown colour; those on the top of the head diverging like the rays of a circle. On the other parts, the hair is shorter, of a dull brown, slightly inclined to white on the flanks and belly; tail furnished at the tip with a number of blackish-brown bristles; elsewhere, nearly naked. Length, from nose to root of tail, about five feet; length of tail, eleven inches. Inhabits the interior of Cape Colony; rather rare."

In the frontier districts, the vlacke-vark is recluse, and seldom ventures to seek food during the day; but in more remote parts of the country, inhabited by natives destitute of the efficient arms of the colonists, it is less apprehensive, and far more abundant, and is to be met with at all times. It roams abroad, however, more particularly, late in the evening, during night, if it be moonlight, and early in the morning. When disturbed in its retreats, and especially when hunted, the vlacke-vark is a very dangerous animal, and strikes with its tusks, which are dreadful weapons; it has been known to cut, with one stroke, completely through the fleshy part of a man's thigh. We learn that though this animal is used as food by the colonists, the Hottentots, and the Bechuanas, it is rejected by the Coast Caffres, who are much more particular as to what they eat than any other natives of South Africa, and consider as an inferior class persons who consume as food the articles which they hold as prohibited.

In his second voyage into the interior of Africa, Le Vaillant states, that in one of his huntings he killed a monstrous boar, absolutely different from all known hogs. The snout, instead of being of the usual form, was very wide and

square; the eyes were seated high on the forehead, but little separated from each other, and small; on each side, upon the cheek, a cartilaginous and very thick skin, or lobe, three inches in height, and as much in diameter, elevated itself horizontally. "At the first glance," he observes, "these excrescences may be taken for the ears of the animal, and this the rather, because the ears, which are applied against the very short neck, are partially hidden in an enormous mane, the rusty-brown and grayish bristles of which are sixteen inches long upon the shoulders; directly below these lobes may be remarked a bony protuberance, projecting more than an inch. It has, besides, four tusks of the nature of ivory, two in each jaw. The upper tusks, from seven to eight inches long, are very thick at their origin, and terminate in an obscure point; they are furrowed, and rise into the air from the lips; those of the lower jaw are much smaller, and so applied against the large ones that when the mouth is shut, one would take them as constituting a single tusk on each side." The head of this boar is truly hideous, and, at the first view, one finds striking analogies and resemblances in it to that of the hippopotamus, which is hardly less frightful. Le Vaillant then cautions those systematic naturalists who have been accustomed to view nature only according to rules which they have established, against regarding this animal merely as a wild hog; "for," as he observes, "besides its large heavy snout, it wants incisors in both jaws, and notwithstanding its wide-spread muzzle, it turns up the earth to seek for roots on which it feeds. It is very fleet, though very stout and large, and goes so fast that the Hottentots call it the *runner*.*" The *vlacke-varck*, or *engallo*, was well described many years ago by Allamand, Pallas, and Vosmaer, from personal observations upon two living specimens at the Hague, which were procured within 200 leagues of the Cape of Good Hope, and sent as presents from M. Tulbagh, the governor of that colony, to the Prince of Orange; the first of these, which had been captured in 1765, in an adult state, having its upper tusks protruding seven inches from the mouth, soon became excessively savage and unmanageable, and actually tore to pieces a domestic sow, which was introduced into his place of confinement in the hope of procuring a cross-breed, and also similarly injured a second under the same circumstances. At length he took offence at one of his keepers, whose thigh he severely lacerated. It was then found necessary to circumscribe the limits of his cage, after which he did not survive above a twelvemonth. On the voyage from the Cape, however, he was more easily managed, and, indeed, became

partially domesticated by the sailors; yet, even those most accustomed to him were occasionally subject to his attack. With strangers he never offered to become familiar, and, on their approach, would retreat slowly backwards, keeping guard in front with his formidable tusks. One day, during his residence at the Hague, he contrived to tear up a number of the paving bricks of his yard, and before the return of his attendant, who had been absent only a few minutes, he had made a very large excavation in the earth, with the view, it was supposed, of reaching a sewer below. This circumstance sufficiently testified the use and power of his tusks. So strong and so stubbornly intent was he in this design, that it was not without the greatest difficulty, and the united efforts of several men, that he was forced from the spot.

The other animal, sent from the Cape in 1766, was much younger than the former, having tusks only two inches in length. He evinced much more mildness and docility of disposition, and would express the pleasure he felt at being permitted to enjoy his liberty, as he was occasionally, by bounding, frisking, and running after other animals, displaying in his gambols much greater activity than is ever exhibited by the common hog; while running, he invariably carried his tail in an erect position.

These boars were fed upon grain and roots, and were particularly fond of barley, wheat, and bread made of rye. Their senses of smelling and hearing appeared to be extremely acute, but the sphere of vision was impeded by the lobes on the cheeks.

2. THE ABYSSINIAN WART-HOG, HARUJA or HALLUF (*Phacochoerus Eliani*, Rüppell).

This species is distinguished by the presence of strong incisor teeth, two in the upper jaw, six in the lower. The head is *elongated*, and the chaffron *concave*.



[PHACOCHERUS ELIANI.

In *Phacochoerus Eliani* the skin is of an earthy colour and scantily bristled. A mane, which extends along the back, rises between the ears, and the single hairs of it are frequently ten inches long. All the bristles, those of the mane included, are of a light brown. They have not each

* The colonists term it *harilooper*, or courser, according to Vosmaer, a term which Sparman comments upon in his account of the *bosch-varck*, and to which we have previously alluded.

a separate root, but three or six bristles form a tuft, having one common root. The whole body, with the exception of the back, appears rather bare. The head is broad along the brow, which is somewhat depressed; the eyes are small and situated very high up, and there is a depression below them; near them is a wart, which, as compared with a smaller one alongside the cheek, may be called the larger wart. These warts are formed of thickened skinny tissue, and are smaller than in the species from the Cape. A whisker of white hair, curling upwards, runs along the lower edge of the under jaw. The eyelashes are blackish, the eyebrow bristles long and black, and under the eyes is a tuft of bristles. The ears are cut obliquely at the lower part of their external edge, and the whole margin is bordered by white bristly hair. The tail is nearly bare, thin, and tufted with hair. On the fore-feet is a space of thick, hard, protuberant skin, on which the animal kneels.

This species was first observed by M. Rüppell, in Kordofan, but he afterwards met with it in greater abundance on the eastern slope of Abyssinia. According to this traveller it haunts tracts of brushwood and forests, and creeps on its bent fore-feet in quest of food. In this posture it digs up the roots of plants with its enormous canine teeth, and proceeds, in this posture, pushing its body forwards by means of its hind limbs, and ploughing up the ground as it goes.

We have already expressed our suspicions that the species from Guinea and Cape Verd is identical with the Abyssinian animal; a suspicion justified by the characters of the Cape Verd hog, which we find to be those of *Phacochærus Æliani*, namely, the presence of incisors, and the elongation of the head, the extension of the upper jaw beyond the lower, the more pointed and narrow form of the ears, the slender tufted tail, and the palish-brown colour of the integuments. (See Buffon, *Hist. Nat.*, tome xv., p. 148; tome xiv., p. 409; *Suppl.*, tome iii., p. 11—article *Sanglier du Cap-vert*. Cuvier's *Règne Animal*, vol. i., p. 244.

The Cape Verd wart-hog is the *emgalo* or *engallo* of Barbot (*Guinea*, p. 487), and the *sus angalla* of Boddaert.

GENUS DICOTYLES.

The genus *Dicotyles* is peculiar to Mexico and South America, and there represents the *Suidæ* of the Old World; occupying, in the forests of Guiana, Paraguay, &c., the situation of the wild hogs of Europe and Asia.

The peccaries (Les Pécaris) were first separated from the genus *Sus* by Cuvier, who established the genus *Dicotyles* for their reception. The propriety of their separation cannot be questioned. These animals, indeed, in their general contour, in their clothing of stiff harsh bristles, in

their gait, their grunt, and habits of rooting in the earth with their snout, resemble the hog. Like the hog, they erect the bristles of their neck and clash their teeth when angry. They are also capable of domestication, and become extremely familiar; and, indeed, so strong is the similarity between them and the former animal, that it cannot surprise us to find all zoologists, from Linnæus to Geoffroy and Illiger, assigning them a place under the genus *Sus*. Yet they exhibit many differential peculiarities. Their dentition differs from that of the hog; the incisors of the upper jaw are four instead of six; the molars are six on each side in each jaw; and the tusks, which are of small size compared with those of the hog, instead of projecting with an upward curve from the sides of the mouth, have the ordinary direction; those of the upper jaw point downwards, those of the lower jaw upwards. They are sharp and effective weapons, adapted for biting rather than striking, but far less formidable than those of the wild boar.

The limbs again are different: not only are they more slender, shorter, and more delicately turned than those of the hog, but there are only three toes on the hinder feet, the outer toe being wanting; nor is this all: the metacarpal and metatarsal bones of the two middle toes of each foot are consolidated together so as to form a canon-bone. The stomach, moreover, is divided into various pouches or sacculi. The tail is wanting, or reduced to a mere tubercle; and a large glandular apparatus beneath the skin, on the loins, pours out from an orifice a secretion of disgusting odour. We may observe, in addition, that the muzzle is acute, the head rather large, and the eyes small but lively.

Two species only are known; but Linnæus was either acquainted with only one species, or he confounded the two together under the name of *Sus Tajassu*. It is to Azara that the clear discrimination of the two species is originally due. These two species differ indeed from each other not a little in size and markings, and, to a certain extent, also in habits; yet, after all, not so much so as to have prevented the impression on M. De la Borde that they were nothing more than distinct herds or races of one species. Buffon describes only one species, which he terms *pécari* or *tajaçu*, and which, as the description and two very good figures prove, is the collared peccary or *taytétou* of Azara; but Buffon, in the course of his description, alludes to a dark-coloured wild or maroon hog, "*cochon maron*," which he regards as the common hog, emancipated from domestication. He observes, for instance, that "the species of peccary has continued unaltered, and has not intermingled with that of the '*cochon maron*,' for it is thus that they call the hog of Europe trans-

ported to and become wild in America. These animals meet together in the woods, and even go in company without any farther results." But is this "*cochon maron*" of Buffon the emancipated hog of Europe? We incline to the opinion of Azara, who regards it as the white-lipped peccary or *tagnicati*, and which exceeds the collared species in size. Not aware that there were two species of peccary, Buffon, who had heard of troops of wild pig-like animals differing from the collared peccary, jumped to the conclusion that they were nothing more than feral swine. Hence the error.

"The hogs," says Azara, "which Buffon believed to be the descendants of those transported by the Spaniards, are not hogs but *tagnicatis*, since the characters which he indicates related exactly to these latter animals, namely, their wild existence in America, and the dark colour, a form of body more lumpy, the head thicker, and the hair coarser than in the domestic hog." It is this white-lipped species which is described by Sonnini, who states that in Guiana it is exclusively termed peccary. But Azara observes, the Guaraní Indians give indifferently the names of *couré* or *tayazou* to two animals of their country, and also to the domestic hog; but nevertheless they do not cease to impose upon the two indigenous species of the country the respective names of *tagnicati* and *taytétou*, while they distinguish the hog derived from Europe by that of *cochi*, apparently a corruption of the word *cochon*, and equivalent to it in meaning. Hence it would appear that the terms *couré* and *tayazou* or *tajazou* (sometimes written *tajagu*), have a general rather than a restricted and specific signification.

These three animals, says Azara, namely, the hog and the two species of peccary, "resemble each other both in external form, in the manner of walking, and in their taste for the same kind of food; inasmuch as they root in the ground, eat and drink in the same mode, erect their bristles in anger or terror, respire energetically, and grunt on being irritated." Azara goes on to say, "The two indigenous species of Paraguay, when taken young, are domesticated with more facility than the wild hog; they go about at liberty, and follow persons soliciting to be scratched, so that in a short space of time, and with no trouble, they are reduced to complete subjection. It is said, and I believe it, that their flesh is good, but that it is not so fat as that of the hog. This is not to be wondered at, first, because they are not properly fed to become fat; secondly, because they are always covered with an infinite multitude of ticks, which abound in the woods." One thing, we may add, is requisite when the peccary is killed for food; namely, the immediate removal of the lumbar gland; for if this be not done, the flesh acquires a bad odour

and taste. Nevertheless, the Indians eat it without this precaution. To some persons, indeed, the scent of this gland is even agreeable; but to most it is insufferably disgusting. The number of young produced by the female at a birth is only two.

1. THE WHITE-LIPPED PECCARY, OR TAGNICATI (*Dicotyles labiatus*, Cuv.; *Dicotyles albirostris*, Illiger).

This species, which exceeds the collared peccary in size, is eminently gregarious in its habits, associating in bands of many hundreds, which traverse the country in quest of food. These troops are headed by a leader, whose course they follow. Nothing impedes them; they force their passage through the densest thickets, and cross rivers, however broad or deep, with the utmost facility. Should the cultivated lands of a colonial settler lie in their way, they completely devastate every field capable of affording them food; they plough up the ground in search of roots; they trample down and devour the corn; they destroy the enclosures, and leave a scene of destruction behind them. Nor is it safe to attack one of these hordes, unless indeed the means of instant escape are at hand; for when united in a common cause these animals are both prompt and resolute. They erect their bristles, make a loud clattering with their teeth, and rush upon their assailant; who, if he escape not by mounting a tree, or gaining some spot inaccessible to them, is immediately surrounded, thrown down, and torn to pieces. The fierce and powerful jaguar or the puma dare not, it is said, attack a troop thus united, though they often seize upon an unwary straggler ere the main body can arrive to the rescue. Azara says, that while the troop is pursuing its route, should one of the number hear any suspicious noise, "he gives notice of it by clattering his teeth, which is repeated by all the rest, who stop to investigate the matter. If they find that no danger threatens them, they continue their march without attempting any injury, as I myself have often experienced. But if they are attacked they unite and surround the man, the dog, or the jaguar, commencing the assault, and tear him to pieces if he do not mount a tree, or if he have not the good fortune to kill the chief or leader, for on this event they all take flight, which is not the case should numbers fall and the leader be safe." "It is said that the jaguar follows the troops of the *tagnicati* in silence, and then, seizing a favourable moment, he darts upon one of the hindmost, laying him prostrate in an instant. He then climbs a tree, whence he descends after a certain interval, and when all the troop has retired, to make his meal upon the carcase."

In Guiana, Sonnini was often surrounded by a herd of peccaries, exasperated at the havoc made among them by the guns of himself and his com-

panions. Safe from their rage, in a tree, the traveller at his ease beheld their conduct: they encouraged their wounded companions by grunts, and by rubbing their snouts together, still perseveringly maintaining their ground with bristles erect and eyes firing with rage. They would often stand an incessant *fusillade* of two or three hours, before they would quit the battle-field and leave their dead to the conquerors. Such encounters supplied the travellers with the means of making a grand feast. A great gridiron, so to speak, of sticks fixed in the ground, some three feet in height, with numerous small branches laid on it in a transverse direction, formed a convenient cooking apparatus. On this were placed the pieces of peccary-pork, and broiled over a slow fire kept up during the night. On these forest feasts Sonnini descants with enthusiasm, and looks back with regret.

M. Schomburgk, on his account of an ascent up the river Berbice, gives the following narrative of an encounter with these animals, which he calls *kairounies*:—"While the men were employed in cutting through a large mora tree, information was brought that a herd of kairounies, the large peccary or Indian hog, was feeding at a short distance from the river; all our guns were immediately put in requisition, and off we started, Acouritch the Carib, armed with bows and iron-headed arrows, in the van. I first came up with them, and found them in a pool of water, where they wallowed in the mire like our domestic hog; one appeared to stand watch while the rest enjoyed the muddy bath, the young ones of various sizes keeping in the middle. When I was at a distance of fifteen yards, the sentinel observed me, the bristles of the back arose, and it turned toward me chattering formidably with his teeth; in the next moment it lay prostrate in the mud pierced by a rifle ball; but how can I describe the bustle, the rush, and the chattering of the tusks of upwards of two hundred, which immediately afterwards were seen to seek security by a rapid flight in the opposite direction. An Indian, who had come up by this time, fired after them and shot another, and the retreat was now perfect. I had loaded again, but hesitated a moment to wade through the swamp; the Arawak Mathias requested me to give him my rifle and ammunition, and off he started with it. I heard him fire four or five shots shortly after at some distance on my right, and while yet calculating how many of them might have told, I heard a rushing noise, like a whirlwind, approaching through the bushes: the peculiar growl, and that awful clapping of the teeth, did not leave me long in doubt as to its cause. It was evident the herd had divided and were coming directly towards me. I stood alone, unarmed, and had not even a knife to defend myself. I know

not yet how I climbed the lower part of a mora tree, when by they rushed, their muzzles almost sweeping the ground, and their rough bristles on the back standing erect: they might have numbered fifty. They came and passed like a whirlwind; and, before I had recovered from my astonishment, I heard them plunge into the river and swim over to the opposite bank. The other hunters had not been so fortunate as I expected; excitement or fear made them miss where it would have appeared almost impossible. Three, including the one I had shot, had been killed with guns, and one with an arrow; they were a most welcome addition to our stock, as we were already obliged to economize, and our endeavours to procure fish had not been successful." "The cry of the kairounie, when full grown, is a grunt, but that of the younger ones resembles the bleating of a goat."

Among the native names of this species may be enumerated *paquira*, whence our word peccary, or *pécari* in French; *apida* and *tirigua* (Humboldt).

The white-lipped peccary is not only taller, but is more robust in its proportions than the collared species; its head is larger, the snout longer, and the nasal disc or button more expanded at the sides. Its limbs are stouter, and the canine teeth are more developed. It often measures three feet and a half in length, and weighs a hundred pounds. The general colour is black slightly grizzled, the bristles around the ears are long and full, as is also the mane along the neck and back. The sides of the upper jaw and the whole of the under jaw are white, whence its Paraguay name of *tagnicati*, which, according to Azara, signifies white-jaw. The female breeds only once a-year, and produces two at a birth. In the young the livery has a striped appearance much as we see it in the young of the wild hog, but the stripes soon begin to disappear, and after a year are altogether lost. Cuvier considers this species both as the *taytétou* as well as the *tagnicati* of Azara, but this is not correct; the former title belongs to the collared species. The white-lipped peccary is a native of Guiana and Paraguay.

2. THE COLLARED PECCARY (*Dicotyles torquatus*, Cuvier).—This species is the *taytétou* of Azara, and the *patira* of Sonnini. It is the *quauhila coyomatl*, *quapizotl*, and *aper Mexicanus* of Hernandez, and the *taiagu* of Piso. It is a native of Mexico, Guiana, Paraguay, &c. This species differs in its habits from the preceding, inasmuch as it is far less gregarious; instead of herding in large troops, which perform a sort of migratory march over extensive tracts of country, it lives only in pairs or in small families, which seldom stray far from their fixed abode in the dense forest, and feed upon roots and other vegetable aliment, to

which fish and reptiles are occasionally added. It is said that they are dexterous in skinning snakes and lizards before devouring them, and that they destroy the most poisonous with singular adroitness. Occasionally they make inroads on the adjacent cultivated fields, and are reported to be partial to sugar-canes, potatoes, and maize. The female breeds once a-year, producing, like the former, two at a birth, and she defends her young with great courage and pertinacity. These animals conceal themselves and their young in hollows at the roots of large aged trees, in holes in the ground, and caves of any kind capable of affording them concealment. There is little to fear from the collared peccary, for though not destitute of spirit, and capable of defending itself if attacked, it has not the aid of collected hundreds, the onset of which in the case of the white-lipped species is so much to be dreaded. It derives no support and no confidence from numbers; hence it avoids its enemies, and trusts to flight and concealment, unless forced to act upon the defensive in its extremity. Setting aside man, the jaguar is its most formidable foe, and numbers fall victims to this rapacious beast of prey.

The collared peccary has been bred in a state of domestication in South America and the West Indies, and might, no doubt, be early acclimatized as tenant of the sty in Europe. The same observation will apply to the former species. We have seen both animals in the menagerie of the Zoological Society as familiar, or nearly so, as the ordinary hog. But then, granting their flesh available, their peculiarly disgusting odour would militate against their general introduction; indeed it must not be supposed that they are to be regarded, in any sense, as rivals of the hog. In the first place, they will not fatten like the hog, nor will they yield meat of such quality, whether for dressing fresh, for pickling, or for bacon. In the next place, they produce only two at a birth, and that only once a-year; so that, granting their lumbar gland was absent, and that they equalled the hog in excellence of flesh, they could never compete with that fertile tenant of the sty. Piso, indeed, praises the flesh of the peccary, and Sonnini relished it; but, as Mr. Bennett observes, "although we may readily imagine that, under the circumstances in which he (Sonnini) partook of these animals, they must have been an exquisite treat, it does not follow as a necessary consequence that in other places and at other times he might have been so well disposed to relish these delicacies of the forest."

The white-lipped and the collared peccary are, as we have said, confounded together by the older writers, and among them by Buffon, who commits several errors in his description—a description, as regards the markings and the general characters

of the animals, applicable rather to the white-lipped than to the collared species. But, setting aside this confusion, he commits two glaring mistakes, which we cannot omit to notice. In the first place, he says—"These animals occupy, in their native country, rather the *mountains* than the lowlands; they do not affect morasses and mire, as do our wild boars." Now the fact is, that they do inhabit lowlands, and they also delight in the mud-bath. Azara makes the following comment on this statement:—"Buffon adds that the peccary prefers the mountains to the valleys, because he is ignorant that here (*viz.*, in Paraguay) by the term *mountains* are not meant heights or cordilleras, but *immense forests*, which both species of peccary affect, whether in valleys, or plains, or on elevations." In the second place, Buffon states that the peccary "brings forth a numerous litter, and that probably more than once a-year." Here he made an assertion, trusting to analogy, which deceived him; he thought that because the hog was fertile, the peccary must be so; but, as we have said, the peccary breeds only once a-year, and produces only two young ones at each birth.

The odour of the collared peccary is very disgusting; but it most probably differs in intensity at different seasons of the year. Certain it is, that we have perceived it less on some occasions than on others;—nevertheless, we cannot agree with Azara in regarding it as "musky, sweet, and agreeable." It is, however, as Azara observes, very probable that the lumbar gland may exhale different odours, according to the food of the animal, its state of irritation, and other circumstances.

The collared peccary measures about three feet in length, and seldom weighs more than fifty pounds. "Its general colour is yellowish-gray, resulting from the manner in which the bristles are marked by alternate rings of grayish straw-colour and black. A row of long bristles extends backwards from between the ears, forming a somewhat erectile mane on the back of the neck, the bristles becoming gradually longer as they approach the tail. The face is more grizzled with yellow than any other part, with the exception of a narrow oblique line of yellow-pointed hairs, which passes from behind the shoulders to the fore part of the neck, and from which the specific name of the animal is derived. The colour of the legs, as well as of the hoofs, is nearly black. The ears are small, upright, nearly naked, and of a grayish colour. On the legs and muzzle the hairs are extremely short. During the first year, the young present a uniform tinge of reddish-brown.

Among the fossil forms of extinct pachydermata, that which appears most immediately to approach the peccaries is the *chaeropotamus Cuvieri* (Owen). This animal, the remains of which occur, as we have said, in the gypsum of Montmartre

and in the eocene marls of the Isle of Wight, must, as Professor Owen observes, have closely resembled the peccaries of America, but was about one-third larger; and, as he adds, it is a singular fact, that "the living sub-genus of the hog tribe, which most resembles the *chaeropotamus*, should be confined to the South American continent, where the llama and tapir, the nearest living analogues of the *anoplotherian* and *palæotherian* associates of the *chaeropotamus*, now exist, and which was formerly inhabited by a genus *machrauchenia*, which connects the llama with the palæothere."—*Hist. of Brit. Foss. Mamm. and Birds*. We may here observe that of three living species of tapir, two are natives of South America, and one is peculiar to Malacca and the island of Sumatra.

In the British Museum are fossil or semi-fossilized remains of the peccary from caverns in South America. We do not pretend to assign to them an early date, yet the fact is not destitute of interest, the rather as fossilized and semi-fossilized bones of the wild hog occur in the turbaries or peat bogs, and in the caves of Europe. To these we shall refer hereafter.

Here, then, we close our sketch of the family *suidæ*, or, in other words, of the Hog tribe, as far, at least, as those species are concerned which do not immediately bear upon our present subject. In looking over our list, we find that Asia is the richest in species. Europe can boast of one only, and that not confined to its boundaries, but common also to Asia; Africa contains three known indigenous species, probably more; America only two. The total number of species amounts to twelve, divided into four genera, or, as some regard them, merely sub-genera, or sections of the Linnæan genus *sus*. Two circumstances are here worthy of notice: first, no genus, or, if the term be preferred, no family, among the pachydermata contains such numerous living species as *sus*; secondly, no family or genus among the pachydermata is so extensively spread. We are not, of course, alluding to domestic animals, as the horse

and ass. It is to wild races alone that we refer, and, consequently, to their natural geographical distribution. The present pachydermata, indeed, are but the lingering relics of an order once abounding in species which were, many of them at least, most extensively diffused. Fossil relics of elephants, of mastodons, of equine animals, of hippopotami, of rhinoceroses, are spread over Europe and Asia, from the polar regions to the most southern latitudes. They attest the extent of territory once occupied by races of pachyderms, where now not one living form exists, excepting, perhaps, the wild hog. The limits of the few existing pachydermata are comparatively restricted. Of two species of elephant (a genus which once contained numerous species common in Europe and in our island, if then insular), one is restricted to the warm parts of Asia, the other to Africa. About six species of rhinoceros are known, and of these some are African, the others belong to India and its islands. The hippopotamus, of which a huge species once revelled in our waters, is confined exclusively to Africa. Of three species of tapir, two are South American, the other a native of Malacca and Sumatra. The genus *equus* is divided between Africa and Asia.

Still greater, if possible, has the change been in the American continent. Its herds of mastodons, its toxodons, its indigenous equine animals, have all passed away, and four species alone, setting aside what man has recently introduced, represent the mighty pachyderms which once roamed the plains and forests of America. These four consist of two tapirs and two peccaries.

Looking at Europe exclusively, elephants, mastodons, palæotheria, hippopotami, rhinoceroses, anoplotheria, hyracotheria, dinotheria, chaeropotami, equine animals, and others, have departed, and left only their relics to attest their former occupation of our quarter of the globe. Europe now possesses only one indigenous pachyderm, the wild hog. To this animal let us now devote a more particular attention, commencing a distinct chapter.

CHAPTER II.

THE WILD HOG.

THAT the wild hog is the source of our ordinary domestic race cannot be disputed; and as little can we doubt its extreme antiquity. The hog has survived changes which have swept multitudes of pachydermatous animals from the surface of our earth. It still maintains an independent existence in Europe, and presents the same characters,

both physical and moral, which the earliest writers, whether sacred or profane, have faithfully delineated. The domestic stock has indeed been more or less modified by long culture, but the wild species remains unaltered, insomuch that the fossil relics of its primitive ancestors may be identified by comparison with the bones of their descendants.



THE WILD BOAR.

The fossil relics of the genus *sus* have been found in the miocene and also in the pliocene deposits of the tertiary system of Lyell. Kaup, for example, has described fossil bones of the genus *sus* from the miocene Eppelsheim sand, in which they were associated with those of the mastodon and dinotherium; and MM. Croizet and Jobert, in their account of the fossils of Auvergne, describe and figure the fossil bones of a species of hog, which, as was satisfactorily proved, must have lived co-existent with and on the same locality as extinct elephants and mastodons. According to these geologists, the facial part of the fossil hog discovered by them is relatively shorter than in the existing species; hence, under the supposition that their fossil animal might have been distinct, they conferred upon it the title of *aper (sus) Avernensis*. How far this distinctiveness is real, yet remains to be seen; at all events, Professor Owen, in his valuable work on British fossil mammalia, places the *sus Avernensis*, with a query, as one of the synonyms of the *cochon fossile* of Cuvier, *sus scrofa fossilis* of Von Meyer (*Palæologicâ*, p. 80), *sus priscus* of Goldfuss (*Nova Acta Acad. Nat. Car.*, t. xi., pt. 2, p. 482), the *fossil hog* of Dr. Buckland, and the *sus scrofa*, Owen, in *Report of British Association*, 1843, p. 228.

With reference to the fossil remains of the hog, Professor Owen thus writes:—"When Cuvier communicated his memoir on the fossil bones of the hog to the French Academy, in 1809, he had met with no specimens from formations less recent than the mosses, or turbaries and peat-bogs, and knew not that they had been found in the

drift associated with the bones of elephants. He repeats this observation in the edition of the *Ossements Fossiles*, in 1822; but in the additions to the last volume published in 1825, Cuvier cites the discovery by M. Bourdet de la Nièvre of a fossil jaw of a *sus*, on the east bank of the lake of Neufchatel, and a fragment of the upper jaw from the cavern at Sandwich, described by Professor Goldfuss.

Dr. Buckland includes the molar teeth and a large tusk of a boar found in the cave of Hutton, in the Mendip hills, with the true fossils of that receptacle, such as the remains of the mammoth, Spelæan bear, &c. With respect to cave-bones, however, it is sometimes difficult to produce conviction as to the contemporaneity of extinct and recent species."

This observation applies merely to cave-bones, and not to such as are imbedded in deposits with other remains.

The oldest fossil remains of the hog, from British strata, which Professor Owen states that he has examined, were from fissures in the red crag (probably miocene of Newbourn, near Woodbridge, Suffolk):—"They were associated with teeth of an extinct *felis*, about the size of a leopard, with those of a bear, and with remains of a large *cervus*. These mammalian remains were found with the ordinary fossils of the red crag; they had undergone the same process of tituration, and were impregnated with the same colouring matter, as the associated bones and teeth of fishes, acknowledged to be derived from the regular strata of the red crag. These mammaliferous beds have been

proved by Mr. Lyell to be older than the fluvio-marine, or Norwich crag, in which remains of the mastodon, rhinoceros, and horse have been discovered; and still older than the fresh-water *pleistocene* deposits, from which the remains of the mammoth, rhinoceros, &c., are obtained in such abundance." To this the Professor adds:—"I have met with some satisfactory instances of the association of fossil remains of a species of hog with those of the mammoth, in the newer pliocene fresh-water formations of England."

The most usual situations, however, in which the fossilized bones of the hog are met with, are in peat-bogs, often at the depth of many feet, and in association with the remains of the wolf, the beaver, the roebuck, and a gigantic red-deer; generally they underlie the bed of peat, and rest on shell-marl or alluvium. Of the identity of these bones with those of the ordinary wild hog all doubt has been removed by the most rigorous comparisons: nevertheless, we do not assert that no other species of *sus* may not have anciently existed, which, like the mammoth and the mastodon, has become extinct; we mean only to say that the bones of the *sus scrofa* are among the fossil remains of our island and the continent of Europe. Professor Owen gives an excellent figure of the fossil skull of a wild boar, from drift in a fissure of the free-stone quarries in the Isle of Portland.

It were useless to ask how it is that while the mammoth and the mastodon, the urus, the huge red-deer, the gigantic *cervus megaceros*, hyænas, enormous bears, and powerful feline animals, have perished in times geologically recent, the wild hog continued its race. We cannot solve the mystery. It has escaped the fate of these animals—its contemporaries—whatever might have been the causes of their annihilation, and though no longer a tenant of our island, it is spread throughout a great portion of Europe and Asia.

We say the wild boar is no longer a tenant of our island; but its extirpation is only of a recent date. Formerly it roamed our forests, and made its lair in their secluded fastnesses; but our ancient forests are cleared, the tracts of swamp which they enclosed are drained, and their grim inhabitants have passed away. Several districts, it is true, retain the name of "forest," and a few, perhaps, exhibit some traces of their primitive condition; but of others we may truly speak in the language of the poet:—

"The scenes are desert now and bare,
Where flourish'd once a forest fair,
When those waste glens with copse were lin'd,
And peopled with the hart and hind.
Yon thorn—perchance, whose prickly spears
Have fenc'd him for three hundred years,
While fell around his green compeers—
Yon lonely thorn, would he could tell
The changes of his parent dell,
Since he, so gray and stubborn now,
VOL. II.

Waved in each breeze a sapling bough;
Would he could tell how deep the shade
A thousand mingled branches made;
How broad the shadows of the oak,
How clung the rowan to the rock,
And through the foliage showed his head,
With narrow leaves and berries red;—
What pines on every mountain sprung,
O'er every dell what birches hung,
In every breeze what aspens shook,
What alders shaded every brook:—
'Here in my shade,' methinks he'd say,
'The mighty stag at noontide lay,
The wolf I've seen, a fiercer game—
(The neighbouring dingle bears his name)—
With lurching step, around me prow,
And stop against the moon to howl;
The mountain boar, on battle set,
His tusks upon my stem has whet;
While doe, and roe, and red-deer good
Have bounded by through gay greenwood.'"—SCOTT.

Mr. Bell, in his interesting work on British Quadrupeds, notices the fact that the boar was among the beasts of venerie protected by royal edicts. "About the year 940," he writes, "the laws of Hoel Dda direct that it shall be lawful for the chief of his huntsmen to chase the boar of the woods from the fifth of the Ides of November (9th) until the Calends of December (1st).—Cap. XXI., sect 14. In the next century the numbers had perhaps begun to diminish, since a forest law of William I., established in A.D. 1087, ordained that any who were found guilty of killing the stag, the roebuck, or the wild boar, should have their eyes put out; and sometimes the penalty appears to have been a painful death."

We do not think that as early as the time of William the Conqueror the wild boar had begun to be scarce, for we attribute such laws to the feelings and disposition of haughty chiefs or monarchs, who regarded all beasts of chase as formed exclusively for their own pleasure; hence the severe and arbitrary laws laid down respecting them. The following quotation from Jacob's *Law Dictionary* (fol. Lond., 1732), in the article *Forest Laws*, briefly exhibits the regulations with respect to the seasons for hunting, established after the Conquest:—"Beasts of forest are, the hart, hind, buck, doe, boar, wolf, fox, hare, &c; the seasons for hunting whereof are as follows, viz.—that of the hart and buck begins at the Feast of St. John the Baptist and ends at Holyrood Day; of the hind and doe, begins at Holyrood and continues till Candlemas; of the boar, from Christmas to Candlemas; of the fox, begins at Christmas and continues till Lady-day; of the hare, at Michaelmas and lasts till Candlemas."

During the Saxon dominion in our island, the wild boar appears to have abounded. Among the Cottonian MSS. is preserved a rude painting, copied by Strutt, of a Saxon chieftain and his huntsmen pursuing wild swine in a forest, and this picture is alleged to have been executed in the ninth century.

Sharon Turner, in his *History of the Anglo-Saxons*, observes that "among the drawings in the Saxon Calendar in the Cottonian Library (tab. 6, 4) the month of September represents a boar-hunt. A wood appears containing boars; a man is on foot with a spear; another appears with a horn slung and applied to his mouth; he has also a spear, and dogs are following." In the *Saxon Dialogues* we have this conversation on hunting:—"I am a hunter to one of the kings." "How do you exercise your art?" "I spread my nets and set them in a fit place, and instruct my hounds to pursue the wild deer, till they come to the nets unexpectedly and so are entangled, and I slay them in the nets." "Cannot you hunt without nets?" "Yes, with swift hounds I follow the wild deer." "What wild deer do you chiefly take?" "Harts, boars, and fallow deer (*rava*), and goats, and sometimes hares." "Did you hunt to day?" "No, because it was Sunday, but yesterday I did. I took two harts and one boar." "How?" "The harts in the nets; the boar I slew." "How dared you slay him?" "The hounds drove him to me, and I standing opposite slew him." "You were bold." "A hunter should not be fearful."

Whitaker, in his *History of Manchester*, observes that "the face of the island at this period was everywhere tufted with woods, and some particular districts of it were covered with immense forests. Three of these were distinguished over the rest, by the wild extensiveness of their range. One was in Scotland, and lined all the hills in the central parts of the highlands. Another was the Great Forest of the Coritani, which contained several towns and the seat of a whole nation within it; and straggled over the five counties of Lincoln, Nottingham, Derby, Leicester, and Rutland, and even such parts of Northamptonshire as lie to the north of the river Nen. But the third was still larger than either, and swept across the south of the island for a hundred and fifty miles together, ranging even from Kent into Somersetshire. These necessarily remained the secure harbours and great nurseries of the many wild beasts which were then produced in the country. In this appearance of the country the spirit of hunting which actuated the primeval Britons, would be kept alive in the Romans by the nearly equal frequency of the game in the woods, and the nearly equal necessity of preventing its increase upon them. The boar roved at liberty over the woods of the parish, for many centuries after the Roman departure from the station; and consigned the appellation of Barlow, or the Boar-ground, to a district in the south-westerly parts of it, and retained its haunts in the wilds of Blakely till within these three or four ages."

Thus, then, the wild boar passed through the British, Roman, and Saxon periods of our once forest-island, and was not uncommon long after

the Norman Conquest. Of course its territories became gradually straitened and circumscribed. So it was with the feral ox, of which the relics still exist in Chillingham park, and in the parks of Chatelherault and Lyme, though for this fine animal a better fate was reserved. However, we learn from Fitzstephen, in the reign of Henry II., that in the twelfth century the forest stretching northwards of London, abounded in boars and other wild animals, among which he enumerates stags, bucks, and wild bulls.

Later still did the wild hog exist in our island; for although we cannot precisely determine the date at which it became extinct, yet we may glean tracings of it for many years.

In Strutt's *Anglo-Saxons*, vol. iii., p. 19, we have the following notice of the wild boar, in the time of Edward II. :—

"Master John Gyfford and William Twety, that were with King Edward the Second, composed a book on the craft of Hunting, the which book is now preserved in the Cottonian Library. Part of it is in verse and part in prose. It beginneth thus :—

'All such dysport as voydeth ydilnesse
It syttyth every gentleman to knowe,
For myrth annexed is to gentlenesse.

* * * * *
And for to sette yonge hunterys in the way
Of venery, I cast me fyrst to goe:
Of which foure bestes be—that is to say,
The hare, the herte, the wulf, the wild boor also.
And then ben other bestis fyve of chase;
The Buk the first, the Do the second,
The Fox the thyrd, which oft has hard grace,
The forth the Martyn, and the last the Roo."

Afterwards, in plain prose, these authors describe the wild hog in its different stages, according to the terms of sylvan sport :—

"The Boor.—First, he is a *pig* as long as he is with his damme; and then the damme leyveth him—then he is called a *gorgeaunt*; and in the third yeare he is called a *hoggast*; and when they be foure yere of age, they shall depart from the sound for age; and when he *goeth soole*, then he is called a *boor*."

These observations, or rather instructions, indicate an intimate knowledge of the natural history of the wild hog, as we shall afterwards explain. Only we may here add, by way of comment, that the adult wild boar is solitary, which is not the case with the sows, and their several litters of young. Other instructions follow; but these are not very clear, nor very needful to our present purpose—which is to demonstrate, what some persons are unwilling to grant, that in recent times the wild boar was a denizen of our forests; and more than that, that it deduced its lineage from an ancestry coeval with the lost mammoths and mastodons of that portion of the globe which we now call Europe.

Anciently, a work termed 'Tristan,' most probably the name of its author, was expressly devoted to venery. This book is now lost; but in the fifteenth century, Dame Juliana Berners, prioress of the nunnery of Sopwell, and acquainted with this old work, took it as the foundation of a treatise, which, in the spirit of the olden time, she though fit to compose by way of instruction to the youthful nobles of the country, relative to the animals of the chase. Her book is generally termed 'The Book of St. Albans,' and was first printed at the Abbey in 1486. It contains a series of metrical treatises of hunting, hawking, angling, and heraldry; and in its day must, no doubt, have been most acceptable. The boar is expressly mentioned; and it is not improbable that the fair prioress had witnessed the chase of the surly and formidable beast, and been present at its death. Queen Elizabeth delighted to see the deer pulled down by fierce staghounds; and we know the alliterative poem of Holofernes—"The pretty Princess"—which shows us that "ladye fair" thought little of the cruelty of such sports. Nay, since the days of Shakspeare, the slaughter of the battue has been composedly looked upon by the exalted of the gentler sex; why, then, should we smile at the solemn treatise of Dame Juliana Berners, albeit it is the production of a holy prioress? However, it is evident that in her day the wild boar roamed the hills and forests. It is one of her beasts of venery.

"Four manner beastis of venery there are:

The first of them is the *Hart*, the second is the *Hare*;
The *Boar* is one of them; the *Wolf*, and not one mo.
And when that ye shall come, in plain or in place,
I shall tell you which be beastis of *enchase*.
One of them is the *Buck*; another is the *Doe*;
The *For*, the *Morteron*, and the wilde *Roe*.
And ye shall, my dear childe, other beastis all,
Wherso ye find them, *Rascal* ye shall call."

Strange ideas! But such was the fashion.

However, this proves to us that the wild hog, to a comparatively late period, existed in our woods; in fact, not only did it give names to certain places, but it was adopted as the cognizance of ancient families on whose territories it probably continued to be especially protected.

"The village of Brancepeth, and the adjoining hill called Brandon, in the county of Durham, took their names from a wild boar, or *brawn*, which is recorded to have been a terrific beast, and the dread of the whole neighbourhood; his den being on Brawdun (brawn-den) hill, and his usual path or tract leading through the woods of Brancepeth (brawn's-path). Tradition states that one Roger Hodge, or Hoodge, valiantly slew the monster, and delivered the district from his ravages. The seal of this illustrious Roger still remains, and represents a *boar passant*."—*Bell, Hist. Brit. Quad.*

Certain districts in Scotland were also formerly

noted as being frequented by this animal. It appears that a tract of country, now forming one of the extremities of the county of Fife, was anciently called Mucross, or Muccrosse. We read in Martine's *Reliquiæ* that "the place was then a forest for wild boars, and was called in the countrie language, Muccrosse; that is, a land of boars, from *muc*, a sow, and *ross*, a land or island."

In Sir Robert Sibbald's *Fife* there occurs the following notice of another portion of the same district:—"There, a mile west of it, on level ground and fertile, and six miles from Fifeness, is the metropolitan city of St. Andrews: anciently all round was forest and invested with boars; hence this wood was called *cursus apri*; and these lands, called *Byrehills*, were truly *boar-hills*, as the learned Mr. Martine describes in his *Reliquiæ Sancti Andreae*. They tell of one boar that was of vast bulk and fierceness; and that two of his tusks, each sixteen inches long, and four thick, were chained to St. Andrew's altar, in the cathedral church now demolished." To this circumstance Holinshed refers in his *Chronicles of Scotland*: "He also gave unto the church of St. Andrew's the lands called the Boarunke, so named, for that a great boar was slain upon the said ground, that had done much hurt in the country thereabout. The tusks of this boare doe hang in chaynes upon the quier in Saint Andrew's church, afore the high alter, and are sixteen inches in length, and four inches in thicknesse."

Sir Walter Scott introduces into his poem of *Rokeby* an allusion to a fierce wild sow, which once roamed in the forests of Richmond, in Yorkshire:

"For all thy brag and boast, I trow
Nought know'st thou of the Felon Sow,
Quoth Harpool, nor how Greta's side
She roamed, and Rokeby forest wide;
Nor how Ralph Rokeby gave the beast
To Richmond's friars to make a feast."

In a note, Sir Walter says, that the mock romance of the Felon Sow of Rokeby has no small portion of comic humour: "Ralph Rokeby, who, for jest's sake apparently, bestowed this intractable animal on the convent of Richmond, seems to have flourished in the time of Henry VII.; which, since we know not the date of friar Theobald's wardenship to which the poem refers us, may indicate that of the composition itself. The poem is rude, and begins as follows:

'Ye men that will aunders (adventures) winne,
That late within this land hath beene,
Of one I will you tell,
And of a sew (sow) that was was sea (so) strang,
Alas! that ever she lived sea lang,
For feil (many) folk she did whell (kill).

'She was mare (greater) than other three,
The grisliest beast that ere might be,
Her head was great and gray,
She was bred in Rokeby Wood,
There was few that thither goed (went)
That came on live (alive) away.

This formidable beast was, after a terrible battle, killed by "Robert Griffin's son," assisted by a Spaniard, who, however, was forced to retreat, and leave the rest to Griffin :

"She came roveing them againe ;
That saw the bastard son of Spaine,
He braded (drew) out his brand ;
Full spiteously at her he strake,
For all the fence that he could make,
She gat sword out of hand,
And rave in sunder half his shield.
And bare him backward in the field,
He might not her gainstand."

For the remainder of this curious description of the contest with the 'Felon Sow of Rokeby,' see the poem above named, notes to canto fifth.

It would appear from this, that the wild boar was not extirpated from our forests even in the latter part of the fifteenth century. Henry VII. ascended the throne after the battle of Bosworth Field, and the defeat of the "wretched, bloody, and usurping boar," in 1485.

That the sport of boar-hunting should have been followed with ardour by our warlike forefathers is not surprising. It was a sport replete with danger, both to men and dogs ; it afforded opportunities for the display of courage, strength, and address, and called up the energies both of mind and body. It was practised both on horseback and on foot, and the hunters were armed with strong sharp swords, and tough boar-spears. The animal was roused from his lair by dogs, and, during his retreat, was harassed by the boldest of the pack, but not with impunity ; from time to time would he turn, and, by a succession of rapid blows, leave some of his assailants prostrate. At length, his savage temper thoroughly roused, he would turn round and face the hunters now hard upon him. This was the critical time, the time for the hunter to display his firmness and skill. His object then was to receive the boar either on his spear or sword, aiming either between the eyes, at the breast, or immediately under the shoulder-blade. Woe to the unskilful or the faint-hearted ! If the hunter missed his thrust he was exposed to imminent danger, for the attack of the enraged beast was sudden and impetuous. Sometimes, indeed, the animal, by a sudden movement, would not only avoid the stroke, but contrive to seize the haft of the protruded spear between his powerful jaws, one crunch of which was sufficient to grind the wood to fragments ; the next moment, unless another hunter came to the rescue, and struck with better aim, the assailant was on the ground, ripped up in the abdomen by the sharp tusks of the terrible animal. When the hunters were mounted, the boar struck at the flanks of the horse, raising himself on his hind legs in order to rip with the greater effect, and, not unfrequently, man and horse came to the ground. Shakspere thus draws

the picture of "an angry chafing boar;" and alludes to his well-known habit of apparently sharpening his tusks against a tree, as if preparing himself for an anticipated conflict :

"O be advised ; thou know'st not what it is
With javelin's point a churlish swine to gore ;
Whose tusches never sheath'd he whetteth still,
Like to a mortal butcher, bent to kill."

"On his bow-back he hath a battle set
Of bristly pikes that ever threat his foes ;
His eyes like glowworms shine when he doth fret ;
His snout digs sepulchres where'er he goes.
Being moved, he strikes whate'er is in his way,
And whom he strikes his cruel tusches slay."

"His brawny sides with hairy bristles armed,
Are better proof than thy spear's point can enter ;
His short thick neck cannot be easily harm'd ;
Being ireful on the lion he will venture ;
The thorny brambles and embracing bushes,
As fearful of him, part ; through whom he rushes."

The boar's head was, formerly, a trophy of victory, and was served up at the state tables of our ancestors, on some occasions with ceremonious observances. There is a tract in the *Miscellanea Antiqua Anglicana*, giving an account of a Christmas piece, as it was performed at the University of Oxford in 1607, written by one of the persons engaged in it, in which is the following passage : "The first messe was a boar's head, which was carried by y^e tallest and lustiest of y^e guard, before whom as attendants wente, first, one attired in a horseman's coate, wth a boar's-spear in his hand ; next to him another huntsman in greene, with a bloody faulcion drawn ; next to him, two pages in taffatye sarcenet, each of y^m wth a messe of mustard ; next to whom came hee y^t carried y^e boar's head, crost wth a greene silk scarf, by w^h hunge y^e empty scabbard of y^e faulcion w^h was carried before him. As y^et entered y^e hall he sang this Christmas caroll, y^e three last verses of every staffe being repeated after him by y^e whole companye :

"The boar is dead,
Loo heare is his heade,
What man could have done more
Than his head off to strike,
Melæager-like,
And bring it as I doe before ?

"He living spoyled
Where good men toyled,
Which made kind Ceres sorry,
But now dead and drawne
Is very good brawn,
And we have brought it for ye."

"Then sett down the swineyard,
The foe to the vineyard,
Let Bacchus crown his fall ;
Let this boar's head and mustard
Stand for pigg, goose, and custard,
And so ye are welcome all."

In the first volume of Hone's *Everyday Book*, p. 1619, there is some further information relative to the boar's head at Christmas, and a carol taken

from Wynkyn de Word's *Christmas Carolles*, on bringing in the boar's head.

"The boar's head," says Mr. Youatt, "is to the present day placed upon the table in Queen's College, Oxford, on Christmas day; but it is now neatly carved in wood, instead of being the actual head of the animal. The ceremony is said to have originated in a taberdar belonging to that college having slain a wild boar on Christmas day, which had long infested the neighbourhood of Oxford. He is said to have been going to serve at church, when he met the animal, and to have slain him by thrusting a copy of Aristotle down his throat." We do not require our readers to believe in this marvellous story; that Aristotle should have choked a boar conveys some covert sarcasm.

It is said, but we know not on what authority, that the dish which King Henry II. carried to table with his own hands, when he caused his son Henry (who never came to the throne) to be crowned as his successor, was a boar's head. Rapin merely says, "At the feast upon this occasion the king would carry up the first dish; and, speaking to his son, told him, never was monarch served in a more honourable manner."—(A.D. 1170.) As the boar's head was a dish of state, the account is not improbable. From the same source we learn that Queen Margaret, wife of James IV. of Scotland, at the first course of her wedding dinner was served with "a wyld bore's head gylt, within a fayr platter." Further we learn, that "the abbot of St. Germain, in Yorkshire, was bound to send yearly the present of a boar's head to the hangman, which a monk was obliged to carry on his own horse. This rent was paid yearly, at the feast of St. Vincent, the patron of the Benedictines, and on that day the executioner took precedence in the procession of monks." The narrator of these singular facts unfortunately gives no authorities; and though we doubt not their correctness, we should have felt more satisfaction had he given us the means of verifying them. After all, however, the point is immaterial; all readers of our older literature know the degree of estimation in which the boar's head was held (surely not from its delicacy, but from its being a high trophy of a dangerous chase), in the olden time of merry England. "Old times are changed, old manners gone." But once in the knight's good hall, what time the holly and misletoe bush were hung up, and the yule-log blazed upon the dog-ironed hearth, and the carpet was spread, not on the floor but on the table, might a group around the board have risen up, when the senechal brought in the mighty boar's head, and sung the old quaint lines,

"The bore's heed in hande bringe I,
Bedecked with bay and rosmarye,
I praye you alle singe merrilye
Qui estis in convivio.

"The bore's heed as I understonde
Is the cheef service in the londe,
Loke where ever it be fonde
Servite cum cantico.

"Be gladdé lordes bothe more and lesse,
For this ordeyned oure stewarde,
To chere you allé this christmesse,
The bore's heede with mustarde."
(See Ritson).

These lines are far more elegant and spirited than the last before quoted, and are less spoiled by being miserably modernized. Nevertheless we suspect that the boar's head in latter days was by no means that of the wild animal, but of some domesticated substitute. The notice of mustard in the two carols we have quoted is remarkable. It reminds us of the hundred and sixty gallons, allowed per year in the household of the Duke of Northumberland, during the time of Henry VIII. Shakspere, moreover, in his *Midsummer Night's Dream*, alludes to the ordinary use of mustard, in Bottom's address to 'Mustard-Seed,' Act III.; and see also *Taming the Shrew*, Act IV., Scene III., "Aye, but the mustard is too hot a little." The boar's head was evidently salted and boiled, and eaten with mustard, like that "same cowardly giant ox beef," whose acquaintance with mustard is disclosed by the redoubtable Bottom.

So much for the boar's head "in hand;" of the boar's head as a crest in heraldry much no doubt might be said, but in this science we are not proficient. The ancient crest of the family of Edgcumbe was a boar's head crowned with bays upon a charger; and a boar's head, but not upon a charger, is the crest of a valued friend, J. Grabham, Esq. of Rochford, in Essex. Moreover, the boar's head is and has been used as a sign over the doors of houses of entertainment. Who has not heard of the 'Boar's Head' at Eastcheap?

But with these things we have nothing to do. As a naturalist, perhaps, we must ask pardon for alluding to them. The wild boar itself, not its effigy on crests or on signs, is our present theme—the wild boar of the forest, the mighty beast, surviving the urus and the bison, and which in the feudal ages of our history called forth in its chase all the courage, skill, and prowess of the gallant huntsmen who cheered on their hounds to the assault.

How it is that, devoted as we are as a nation to field-sports and to the chase, the wild boar has not been introduced into the large parks of our nobility, we cannot tell. An attempt indeed was made by Charles I. to restore this noble game to England, and he turned out several wild boars and sows (procured from Germany) in the New Forest, where they multiplied; but the civil wars were no friendly times for the ultimate success of the experiment, and they appear to have been all destroyed, albeit, perchance, some relics of the

strain may be found in the forest pigs of the present day, which are unlike the ordinary breed of Hampshire.

The forest pigs of Hampshire, says Gilpin (*Forest Scenery*), "are very different from the usual Hampshire breed; and have about them several characteristic marks of the wild boar. The forest hog has broad shoulders, a high crest, and thick bristly mane, which he erects on any alarm; his hinder parts are light and thin; his ears are short and erect; and his colour either black or darkly brindled. He is much fiercer than the common breed, and will turn against an ordinary dog. All these are marks of the wild boar, from whom probably in part he derives his pedigree, though his blood may be contaminated with vulgar mixtures. But though he is much more picturesque than the common hog, he is in much less repute among farmers. The lightness of his hind quarters and the thinness of his flanks, appear to great disadvantage in the ham and the fitch."

Gilbert White informs us that General Emanuel Scroope Howe turned out some German wild boars and sows into his forests of Woolmer, and Ayles or Alice Holt, to the great (but foolish) terror of the neighbourhood, and also a wild bull or buffalo; but the country rose upon them and destroyed them. Mr. Bell says that a similar attempt has been lately made in Bere wood in Dorsetshire, but that one of the boars having injured a valuable horse belonging to the worthy Nimrod who exhibited this specimen of sporting epicurism, he caused them to be destroyed. Such an accident might have resulted from the horns of the bull or the sharp antlers of the stag, and we can see no reason why the wild boar should not be introduced into some of our royal forests at least. It would not be more dangerous than the Chillingham wild bull, or the red deer; and unharbouring the boar, with all the accompaniments of the spear, the couteau, and the bugle-horn, and the grand boar-hounds, such as we see in the pictures of Snyders, would be sport quite as worthy of our nobles as the hunt of the hare, or the chase of the fox. It was a sport in which our ancestors delighted; and into which they entered with enthusiasm. It was not, however, only among our own ancestors in "merrie England," that boar-hunting was a favourite exercise; the ancients, that is the ancient Greeks and Romans, were equally devoted to the sport, and many allusions to it abound in the classic writings. It would appear that in most instances strong nets for enclosing or intercepting the animal were made use of, as indeed they are at present in India. Hence Ovid, in his description of the chase of the Calydonian boar, says:—

"Quo postquam venere viri, pars retia tendunt
Vincula pars adimunt canibus, pars pressa sequuntur
Signa pedum."

That is, "As soon as the men have arrived at the spot, some stretch the nets, some uncouple the dogs, and some follow the imprinted foot-tracks." Lib. viii. Fab. iv.

Again, Horace says:—

"Manet sub jove frigido
Venator teneræ conjugis immemor,
Seu visa est catulis cerva fidelibus
Seu rupit teretes, marsus aper plagas."

Under the cold sky remains
The hunter, of his tender wife unmindful,
Whether it be that the hind is in sight of his faithful hounds,
Or that the Marsian boar has broken the slender toils.

Homer in his *Odyssey* describes the contest between Ulysses and a formidable wild boar; and Xenophon alludes to the use of nets in the chase for entangling the animal, or restricting his movements. Dogs were necessary adjuncts, and in the British Museum a portion of Roman tessellated pavement represents very admirably a surly wild boar pursued by a short-tailed sharp-eared dog; the delineation of the former bringing to mind Ovid's description of the animal in the fourth fable of his eighth book, thus translated by Dryden:—

"His eyeballs glare with fire suffused with blood,
His neck shoots up a thick-set horny wood,
His bristled back impaled a trench appears,
And stands erected like a field of spears.
Froth fills his chaps, he sends a grunting sound,
And part he churns, and part befoams the ground,
For tusks with Indian elephants he strove,
And Jove's own thunder from his mouth he drove."

It must not be supposed that boar-hunting is obsolete. It is practised with great eagerness in India, and in those districts of Europe in which the animal still maintains its hold. As in the case of the wolf, the sport is valued only for its excitement, as no part of an old boar, except the head, is eatable. Young animals, and especially such as are under the care of the mother, are esteemed, but these afford no sport in the chase. "As the boar," says Buffon, "retreats but slowly, leaves a very strong odour, and defends himself against the dogs, always wounding them dangerously, it will not do to chase him with good and swift hounds, destined for the stag or roe, as this sort of pursuit would spoil their scent, and get them into the habit of going slowly. Mastiffs, with slight training, suffice for the chase of the wild boar."

These directions are evidently borrowed from a celebrated French treatise on hunting and falconry, written in the sixteenth century by Jaques du Fouilloux, who gives the same advice, alleging that when hounds are accustomed to the overpowering odour of this animal, and besides have their game constantly in view, they soon become unfitted for any other work, as they lose their delicacy of scent. Independently of which, the ferocity of the animal is another objection to their use; for, being valuable rather for speed and the delicacy of their nose than for great

strength, good hounds are risked in an encounter better fitted for dogs of less value.

The old boar-hounds, to judge by the pictures which represent this sport, were large, rough, wire-haired dogs, between the mastiff and old greyhound, or perhaps crossed with the hound. They were dogs of great strength of jaw and of resolute courage, not remarkable for keenness of scent, but nevertheless well fitted for their dangerous service. The boar has been known to kill a dog with a single blow from his tusks, and, when he turns upon a pack, he naturally selects the boldest and most forward, and will lay several of them dead in as many blows. Jaques du Fouilloux relates an instance which came under his notice, in which a boar, pursued by fifty dogs, suddenly turned upon his assailants, and not only slew six or seven of them, but wounded so many more, that only ten of the whole number came home uninjured.

The wild boar is common in the extensive forests of France, Germany, Russia, and Hungary, as well as in Spain and other countries. Even within forty miles of Paris, in the forest of Chantilly, the breed still lingers. The late Prince of Condé, who died in 1830, kept a pack of dogs for the express purpose of boar-hunting. These dogs were a kind of large bony hound, well adapted for the hazardous encounter.

The following account of a boar-hunt is taken from Egan's *Sporting Anecdotes* (p. 165), and will be read with some degree of interest from the circumstance that the great commander of the age was one of the actors in the scene:—"On October 30th, 1817, the hounds of the Duke of Wellington discovered a most enormous boar in the forest of Wallincourt (in the department of Cambray, in France). The animal, on being disturbed, passed rapidly into the forest of Ardipart, which he completely traversed. Being then hardly scented by the dogs, he took to the plain, where he was vigorously pursued by hounds and sportsmen, and ere he could reach another wood was brought to bay. The animal then became ferocious, and destroyed all the dogs that approached him, when one of His Grace's aides-de-camp plunged his spear into his side. This only rendered the beast more savage, when His Grace himself, seeing his dogs would be destroyed, rode up, and with his spear gave the *coup-de-grâce*. The animal made a desperate effort to wound His Grace's horse, and fell in the attempt. Of the numerous field that started in the pursuit, only five besides His Grace reached the end."

It is not often, however, that the spear is used in modern boar-hunting in Europe. This weapon has given place to the rifle, and the sport is consequently deprived of danger, and, we may add, of excitement. In Germany, the huntsman or

jäger, armed with his rifle, goes into the forest accompanied by a dog trained to seek and rouse up the wild boar, the track of which he follows by the scent. When the boar quits his lair, the dog, giving tongue, pursues the game, but at a cautious distance, until he turns and stands at bay. The dog now, without venturing too closely, keeps up an incessant irritation, and dodges about, making feints of attack, until he leads the animal to expose his side to the hunter, who immediately fires, aiming at the shoulder. The boar generally falls, but, if only wounded, he commences a precipitate retreat, upon which a boar-hound is let loose, who pursues him for miles, until the animal drops exhausted, or again stands on the defensive. It is thus in the forests of Hanover and Westphalia, where wild swine are numerous, that numbers are destroyed, not only for amusement, but also for the sake of their flesh. It is from these wild hogs that the celebrated Westphalian hams are procured.

Mr. Howitt, who saw great numbers of wild swine of all ages in the wild boar park of the Emperor of Austria, at Hüttelsdorf, near Vienna, says—"Hunters tell us that, notwithstanding the orders of Government to exterminate swine in the open forests, on account of the mischief they do to cultivated land, there are great numbers in the forests of Hanover and Westphalia, huge, gaunt, and ferocious as ever. These will snuff the most distant approach of danger, and, with terrific noises, rush into the densest woods; or surrounding a solitary and unarmed individual, especially a woman or child, will scour round and round them, coming nearer and nearer at every circle, until at last, bursting in upon them, they tear them limb from limb, and devour them. Tame swine, which are herded in these forests, become mixed in breed with the wild, acquire the same bloodthirsty propensities, and will, in their herds, surround and devour persons in a similar manner."—*Rural Life in Germany*.

These herds are composed of females, and their young of different ages. The boars, after attaining the age of three years, lead a solitary life in the forest. It is not, however, until the age of five or six years that the boar attains his full dimensions; and the duration of his life is from twenty-four to thirty years. The females with their young associate together in herds for mutual protection, and on the approach of an enemy the young are placed in the centre, the older ones forming a circle around them. It is thus that the young are defended against the attack of the wolf, one of the chief foes to be dreaded by them in their native forests; and to which, notwithstanding the vigilance of the old females, they often fall a prey. In the defence of their young, the females are furious, and resolutely attack

any animal which excites apprehensions in their behalf. This even the domestic sow will do when living at large in the woods. Mr. Lloyd, in his *Field Sports of the North of Europe*, gives the following account of the ferocity of a common sow which he met with in Sweden:—"One day in the depth of winter, accompanied by my Irish servant, I struck into the forest for the purpose of shooting capercali. On this occasion we had no other guide than my pocket compass. Towards evening, and when seven or eight miles from home, we came to a small hamlet situated in the recesses of the forest; here an old sow and her progeny made a determined dash at a brace of very valuable pointers I had at that time along with me, who naturally took shelter behind us. My man had a light spear in his hand, similar to those used by our lancers; this I took possession of, and directing him to throw the dogs over a fence, in the angle of which we were cooped up, I placed myself between the dogs and their pursuers. The sow, nevertheless, still pressed forward, and it was only by giving her a severe blow across the snout with the butt end of the spear that I stopped her farther career. Nothing daunted, however, by this reception, she directed her next attack against myself; when, in self-defence, I was obliged to give her a home-thrust with the point of the spear. These attacks she repeated three several times, and as often got the spear up to the hilt either in her head or neck; she then retreated slowly, bleeding at all pores. So savage and ferocious a beast I never saw in my whole life. In the fray I broke my spear, which was as well, for it was by no means strong enough to answer the purpose for which it was intended.

"This was not a solitary instance of the ferocity of the wild swine. It was the same throughout Sweden; whenever they caught sight of my dogs they generally charged, and if they came up with them would tumble them over and over again with their snouts. Cattle were often as bad in this respect as pigs. These ferocious attacks originated, I apprehend, from their mistaking the dogs for wolves; for this reason a person, if he has dogs, cannot be too careful of going near to houses, or through enclosures, as they may be either killed or disabled in an instant. For my part, when I have seen symptoms of a charge coming, I have frequently had to run for it, and to throw my dogs over a fence, if they were unable to surmount it themselves."

Though the wild boar is at all times very savage, it is more dangerous at certain seasons than at others; when in quest of the female his fury is uncontrollable, and should he meet a rival, a most sanguinary combat ensues, not unfrequently ending in the death of one or of both. 'Tis then—

"The bristled boar
New grinds his arming tusks, and digs the ground,
He rubs his sides against a tree—prepares
And hardens both his shoulders for the wars."
Carey's *Virgil*, Georg., lib. iii.

In the month of December or January each male attaches himself to the society of a chosen female. They retire to the deepest recesses of the forest, and for the space of about thirty days the pair never leave each other's company. The female carries her young for about four months, and produces, according to her age, from four to ten pigs, which she immediately withdraws from the cognizance of the male, who, instead of protecting, would destroy them, and even devour them. She suckles her brood for three or four months, but retains them in her suite for a much longer time, instructing and defending them. Her courage in the protection of her offspring is indomitable, and the latter repay her attention by a constant and long-continued attachment. An aged female is sometimes seen followed by several families, among which are individuals between two and three years of age, and consequently almost in the adult state. These young rovers are called by the French hunters *bêtes de compagnie*. Sometimes several females with one or more families herd together, and such assemblages are sufficiently formidable, whether viewed in connexion with the damage which they occasion to the fields in which they pasture, or with the danger which is likely to accrue to the rash and inexperienced huntsman who without due precaution ventures to attack them.

The wild boar, solitary and recluse, may be regarded as nocturnal in his habits; it is seldom, except when forced by the dogs of the hunter, that he stirs from his lair during the day. Night is his season of activity; on the approach of twilight he sets out in quest of food, which consists of acorns, beech-mast, grain, roots, &c. In his search after roots he ploughs up the ground in long furrows with his snout, nor does he refuse such worms or insects as he thus dislodges. Though not strictly carnivorous, the wild boar, like his domestic descendant, does not reject animal matters which chance may throw in his way. He is in fact omnivorous, and is endowed with an appetite and digestive powers suited alike for vegetable or for animal aliment. Unlike truly carnivorous quadrupeds, as the wolf, the wild-cat, the fox, &c., he does not habitually attack and kill other animals for the sake of their flesh, but he devours whatever he may meet with dead in his rambles. Buffon mentions that he has found parts of the skin of a roebuck and the feet of birds in the stomach of a wild boar. Corn lands, bordering forests haunted by wild swine, are subject to their nightly incursions, especially when the grain is ripe, or the ears full; while thus engaged in feasting amidst the tall corn, which prevents their

seeing the approach of any one, it is easy during moonlight nights to come upon them by surprise, and shoot them before they are aware of the presence of the hunters. Vineyards are also subject to the ravages of wild swine, a fact which has been known from the earliest ages. Among the Greeks and Romans it was a custom to offer a hog to Ceres at the beginning of harvest, and another to Bacchus at the commencement of the vintage, because the growing corn and the loaded vineyards are subject to the depredations of these animals. To their ravages in the vineyard the Psalmist thus forcibly alludes: "The boar out of the wood doth waste it, and the wild beast of the field doth devour it."—*Psalm lxxx.*, 13. The Rev. Mr. Hartley, in his *Researches in Greece*, gives the following comment on this passage:—"My friend, the Rev. Mr. Leeves, was proceeding in the dusk of the evening from Constantinople to Therapia. Passing a vineyard he observed an animal of large size rushing forth from amongst the vines, and taking flight with great precipitation. The Greek surigee, who was riding first, exclaimed 'γούρουνι, γούρουνι, wild boar, wild boar!' and it really proved a wild boar, which was retreating from the vineyards to the woods. 'What has the wild boar to do in the vineyard?' inquired Mr. Leeves. 'Oh,' said the surigee, 'tis the custom of the wild beasts to frequent the vineyards and to devour the grapes.' And it is astonishing what havoc a wild boar is capable of effecting during a single night. What with eating and what with trampling under foot, he will destroy an immense quantity of grapes."

Wild boars are not uncommon in Palestine and the neighbouring countries, chiefly in the hills, from which they descend occasionally into the valleys and plains, and sometimes approach very near to the towns, the gardens which surround the towns being a great attraction to them. Dr. Kitto observes that they abound on Mount Tabor, and that "in places where there are European settlers, the wild hogs are shot by the peasants, who lie in wait for them near the fountains or the streams at which they come at night to drink, and, placing the carcasses on asses, carry them to the town for sale to the Franks; they are generally bought whole by one person, who distributes it among his friends. A hog, dead or alive (for we have known young hogs taken and brought alive for sale), is commonly taken for sale to the consul; but in some places, where Franks are numerous in the town, and the hogs too numerous without for the carcasses to be always purchased by the same persons, they are often publicly exposed for sale." Dr. Russell tells us that this was the case in Aleppo in his time. The wild hog (of Palestine) is said to feed chiefly on liquorice-root, which grows in abundance on many of the eastward

plains; and in the proper season, that is in the autumn and beginning of winter, the flesh is delicious, very fat, and easily digestible. Prosper Alpinus affirms the flesh of the hog in Egypt also is more light and delicious than that of Europe.

We take it for granted that the wild hog of Palestine and Egypt is specifically identical with the European animal; Sonnini, however, expresses a doubt on this subject, and observes, "It does not appear to me probable that the wild boars of Europe and Egypt should be the same. The great difference of climate, and the still greater of situation, must necessarily at least have occasioned some variety in the species. More prolific in temperate or cold climates, which appear more suitable to their nature, they inhabit the depths of the forests, which afford them food in abundance; from these they never issue, except to proceed from one wood to another, or to spoil the harvest; and these journeys or excursions for depredation are scarcely ever undertaken but by night. At the rising of the sun they commonly retire to the thickest and the darkest places, as if they dreaded the light and heat of his beams. In Egypt, on the contrary, the wild boar has no shelter; continually exposed to the fervour of a burning sun, he traverses sand equally heated, where he scarcely meets with a few scattered shrubs which afford him little subsistence, and still less shade. He is seen, however, not unfrequently in the desert of Nitria, where animals are more numerous than in any other part of the desert, on account of the collections of water it contains, and the plants which grow on their borders." M. Sonnini further states that these wild hogs are solitary, and that the Mohammedans and Cophts refrain from the flesh of this animal, as they do from that of the domestic hog. He adds, that the wild boar is termed in Egypt *tranzire*, and he supposes that the African wild boar of Buffon and the *tranzire* are the same. The African wild boar of Buffon (*Sanglier du Cap Vert, ou Sanglier d'Afrique*) is a *phacochoerus*, of which one species, as we have said (*Phacochoerus Æliani*), is a native of Kordofan and Abyssinia. But we have yet to learn that the common wild hog of Western Asia, Egypt, and Northern Africa, differs from the European species. The *phacochoerus* is not indigenous in Egypt or the Atlantic chain of mountains.

Bruce, in his *Travels in Abyssinia*, states that the wild boar of that country is smaller and smoother in the hair than that of Barbary or Europe, from which he differs in nothing else. He is met with in swamps or banks of rivers covered with wood. As he is accounted, writes Bruce, unclean in Abyssinia, both by Christians and Mohammedans, and is consequently not persecuted by the hunters, both he and the fox should

have multiplied, but it is probable that they, and many other beasts, when young, are destroyed by the ferocious hyæna. On one occasion, he observes, that, during a hunting excursion, "amongst us we killed five boars, all large ones, in the space of about two hours, one of which measured six feet nine inches; and, though he ran at an amazing speed near two miles, so as to be with difficulty overtaken by the horse, and was struck through and through with two heavy lances, headed at the end with iron, no person dared to come near him on foot, and he defended himself above half an hour, till, having no other arms left, I shot him with a horse pistol. But the misfortune was, that after our hunting had been crowned with success, we did not dare to partake of the excellent venison we had acquired, for the Abyssinians hold pork of all kinds in detestation, and I was now become cautious lest I should give offence, being at no great distance from the capital." These animals do not appear, so far as Bruce may be trusted, to have been other than the common wild hog.

With respect to India, we have, in our list of described species, enumerated the *sus cristatus* of Wagner as distinct from the common wild hog, and as inhabiting certain parts of India. How far the animal noticed by Colonel Sykes and other zoologists as common in the Dukhun and other portions of India (and of the chase of which various writers have given us some animated accounts) is distinct from the ordinary species, is not very clear. We have no reason however to believe that the jungle hog of India and the wild hog of Europe are distinct. At all events the jungle hog is a formidable animal, and its chase is of the most exciting nature. The hunters pursue the quarry on horseback, armed with javelins, which they launch as they gallop along, and are, moreover, aided by dogs. Often the boars are shot from the howdah of the elephant.

Captain Williamson (*Oriental Field Sports*) and Mr. Johnson (*Sketches of Indian Field Sports*) have given not only vivid pictures of the chase of the jungle hog of India, but have also described some traits of its habits and manners replete with interest.

According to Captain Williamson, a great number of the jungle hogs are crossed by stray domestic hogs, insomuch that a thorough-bred animal is not often to be met with, except in the wild districts remote from villages. They are principally known to be such by a broad flat forehead, a comparatively short head and very deep jowl, a full eye, with much display of the white when in action, a high shoulder, a back nearly straight, broad loins, and limbs very strong and compact; but the most certain criterion is the form of the tail, which is rather short, straight (that is, without any curl), and furnished near the

tip with stiff lateral bristles, like the feathering of an arrow. The wild or jungle hogs of India are strong and swift; indeed, it requires a good horse to keep up with their pace, and instances are on record of their having tired out several horses in succession. They are often sought for and found in sequestered spots, to which they resort for water, and if during the chase they can gain these places, and quench their thirst, or bathe in the cool element, they are at once so much refreshed and recruited in strength, as to be capable of recommencing their course as rapidly as ever. The onset of these animals is described as being tremendous. They commence with a trot, increasing it to a gallop as they near their object, and when they make the rush they frequently upset both horse and rider. Captain Williamson observed that, in ripping, they usually make the first cut to the right and the next to the left. While chasing one of these formidable creatures, says the same writer, "it often happens that many persons are cutting grass in the neighbourhood. The hog, indignant and vindictive, seldom fails to deviate from his course to visit and disturb the poor men in their occupation, frequently ripping them very severely. Some take to flight, but the hog, being possessed of most speed, soon comes up, and, running his head between the fugitive's knees, ordinarily gives a cut to each thigh, oversetting and leaving the unfortunate fellow for the purpose of treating others in a similar way. So powerful are these animals, that even the tiger has sometimes cause to repent making an unguarded attack upon them. In such contests, it is true, the latter is commonly victorious; but instances have occurred where both have been found dead, each bearing the marks of his adversary's prowess."

Mr. Johnson has thrown together many valuable instructions, founded upon ample experience, relative to the chase of the wild boar in India, the most important of which to the zoologist are those connected with the haunts of the animal, dependent upon the facilities for acquiring food at the different seasons of the year. According to this authority, "in January, February, and part of March, these animals are more frequently to be met with in sugar-canes than in any other covers.* In them they find a sheltered retreat, with plenty of food which they are remarkably fond of. In this season the rice is nearly all cut, water scarce, and the ground so hard that they cannot easily turn it up to search for roots and insects." "From March to the end of June, the weather is so extremely hot, that hogs are seldom hunted on horseback, they are more frequently killed by being shot from elephants. At this season most

* Hogs are often found in March with three or four inches of fat on the chins and shoulders.

of them go into extensive heavy *bunds* (woods) near the bottom of mountains, the remainder repair to other large woods, *surput* (tassel-grass), *ratan*, *jow* or dagger-grass, jungles that are nearer, and which are often so large that they cannot be driven out of them to be speared, but are frequently shot in them from the backs of elephants. They are now and then to be met with in grass-plains, but finding them in such situations at this season is so rare and uncertain that it is seldom attempted." "In March and April they are generally in good condition, but in May and June most of them are lean, and run so fast as to astonish Europeans who have never seen them before, and who estimate their speed by what they know of tame swine. They are sometimes driven out of jungles by setting them on fire; in this case they are usually shot or caught in nets, the weather being too hot, with the increased heat of the surrounding atmosphere from the fire, for people to undergo the violent exercise of hunting them on horseback with spears." "The rainy season generally sets in about the middle of June; from that time to the middle of July hogs chiefly remain in the same covers they previously inhabited, but feed more in open plains, and where people are preparing ground for cultivation. They may be easily intercepted and hunted as they return to their covers in the morning."

During the inundations common to many parts of India at this season of the year, the wild hogs find covert in the meadow grass, which grows to a considerable height on most of the uncultivated plains, and in these they principally remain until October and November, when they disperse in search of the fresh crops of sugar-canes and rice, which tempt them to wander to great distances over the country. Mr. Johnson informs us that the flesh of the Indian jungle hog is reckoned superior to that of any of the domestic varieties, but that of the sow is infinitely preferable to that of the boar, which is rank and disagreeable.

The same writer gives an interesting account of the manner in which these animals construct their beds, as they are termed, of the meadow-grass above mentioned. This they cut down with their teeth, as if it were done with a scythe, and pile it up into oblong heaps as regularly as thatch on houses. When they have thus collected a large heap they creep underneath it, entering it at one end, and emerging at the other, without disturbing the regularity of the pile. In these they lie perfectly concealed, as they manage to stop up the entrances, but in such a manner that they can see although they cannot be seen.

The jungle hog is remarkable not only for its swiftness, but for the facility with which it is capable of leaping; a fact the more singular when we consider the heavy form and thick-set propor-

tions of the animal. An instance of the wild hog's activity is thus narrated by Captain Williamson:—"A curious incident," he says, "took place near Monghyr, where two gentlemen were pursuing a large boar, which ran down a watercourse leading to a mullah or rivulet. One who was pretty close at his heels followed, and the hog, disappointed of his drink, reascended the bank a little to the right of the way by which he had gone down; and then, turning again to the right, proceeded through the grass across his former track, and leaped over the ravine he had gone through, as the other gentleman was galloping down to it. The hog just passed between the horse's ears and the gentleman's head, and occasioned his hat to fly over with him." The mode of hunting, the danger of the chase, and the exertion required both by man and horse, are thus detailed by Captain Williamson:—"I recollect," he says, "being one of four well-mounted riders, who were completely distanced in a chase of three miles. In crossing the country early in June, about sunrise, we saw at a considerable distance a hog trotting over a plain to his cover, which was a large extent of brambles and copse, from which we could not hope to drive him. As there appeared no chance of overtaking him, we agreed to let him proceed unmolested, and to be at the place whence he had come by daybreak, on the next morning. We accordingly were up early on the following morning, anticipating the pleasure of being at his heels; but on arriving at the spot in which we observed him on the preceding day, we found him nearer to his cover than before. Knowing that when hogs take the alarm they are apt to change their route and their hours, we were not surprised at this manoeuvring. We were still earlier on the third morning, when we took our positions still nearer his place of nightly resort, and had the satisfaction to find that we were in time to bear him company homewards. Here, however, some delay took place. The hog on his breaking through the small jungle where we had awaited him, and through which he had to pass, after glutting himself in a swamp among some rye, sown extremely thick for transplanting, found he was watched. He therefore, after trotting out a hundred yards, gave a sort of snort, and returned; this was precisely what we wished for.

"It was not yet day, and the desire to intercept our prey had made us push forward, so as to place our people far behind; they, however, came up, to the number of a hundred, and after beating the cover for a short time our friend took fairly to the plain. As we were careful not to dispirit him, and had cautiously kept from that side on which we wished him to bolt, he gained upon us a little; he had to go at least three miles, and the whole of the plain was laid out in *paddy* or rice fields,

The hog kept ahead the whole way, so that there was no possibility of throwing a distant spear."

Captain Williamson then alludes to the difficulty of forcing wild hogs from grain or cane plantations in which they establish themselves, disputing every inch with the reapers, and not unfrequently causing them to leave parts uncut, in the hopes that the animals will evacuate them, and return to the jungles; but this migration, if the coverts are somewhat remote, the hogs, now fat and indolent, are in no hurry to perform. In fact, the task of dislodging them is neither easy nor very safe. "It usually requires a great number of persons to drive the hogs out of the sugar-canes, on account of their extent. The beaters should not be more than five or six yards distant from each other, or they will turn back and rush through the intervals. Small drums should be used to frighten them out. Sometimes this will be troublesome; it is particularly so with a sow that has pigs; she will frequently come to the edge and dash through the beaters again and again. The hog being forced from his covert, is crowded on by several horsemen with spears, which they use in the manner of javelins. They pursue the animal at speed as he makes his way to the nearest cover, darting their spears into his body as they come up to him. Those horsemen who are placed in the nearest situation should gallop round to watch the hog passing, and giving the loud halloo should dash at him at full speed, spearing as they come up. Some hogs however are aware of the plot, having been hunted before. Many may be seen with scars, evidently the result of wounds received on former occasions, and such are extremely difficult to deal with. They will break out of the line repeatedly, dash at all they meet with, and eventually create such terror, as effectually to discourage the beaters, who thence get into groups; and though they continue their vociferations, act so timorously as to render it expedient to withdraw them, for the purpose of trying a fresh cover.

"It is very common to see a plough at work on the very edge of the canes where the villagers are beating for hogs; and as the bullocks are extremely skittish and wild, it often happens that they take fright and run off with the plough, which is frequently broken to pieces. The ploughman, alarmed equally with his cattle, also takes to flight, as do all the peasants who may see the bristling animal galloping from his haunt."

It is not only into oxen and their drivers that the jungle hog strikes terror; horses experience a similar panic, and those on which the huntsmen are mounted often take fright, dreading the terrible onset of the mighty boar, which is often so determined as to hurl them prostrate. An instance in point is related by Mr. Johnson:—"I was one (he observes) of a party of eight gentlemen on a

sporting excursion at Hye near the city of Patna, on the banks of the Soane river. Returning one morning from shooting, we met with a very large boar in a rhur-field,* which we did not fire at or molest, as several of the gentlemen were very fond of hunting them, and we had no spears with us. The next morning we all sallied forth in search of him, and just as we arrived at the spot where we saw him the day before, we discovered him at some distance, trotting off towards a grass jungle, on the banks of the river. We pressed our horses as fast as possible, and were nearly up with him, when he disappeared all at once; our horses were then nearly at their speed, and four of them could not be pulled up in time to prevent their going into a deep branch of the river, the banks of which were at least fourteen or fifteen feet high; luckily for us there was no water in it, or anything but fine sand, and no person was hurt. One of the horses which was very vicious got loose, attacked the others, and obliged the gentlemen to quit them and walk to their tents, where one of the horses had arrived before them and the rest were soon caught.

"A few days afterwards we went again early in the morning in pursuit of the same hog, and found him farther off from the grass-jungle in a rhur-field, from which with much difficulty we drove him into a plain, where he stood at bay, challenging the whole party, boldly charging every horse that came within fifty yards of him, grunting loudly as he advanced. I was then a novice in the sport, but I have never seen any hog charge so fiercely. The horse I rode would not go near him, and when I was at a considerable distance off, he charged another horse with such ferocity that mine reared and plunged in such a violent manner as to throw me off. Two or three others were dismounted nearly at the same time, and although there were many horses present that had been long accustomed to the sport, not one of them would stand his charges. He fairly drove the whole party off the field and gently trotted on to the grass jungle (foaming and grinding his tusks) through which it was impossible to follow or drive him."

The same writer states that he was on one occasion present at the death of a boar of most extraordinary size. He measured in height to the top of the shoulders forty-three inches, and his tusks were ten inches long; he was old and thin, but very fierce, and of two large greyhounds slipped at him, one he instantly killed and the other he severely wounded.

We have sufficiently commented on the habits and manners of the wild hog of India; it is, as we have said, generally regarded as identical with the

* Rhur is a species of leguminous plant growing from four to six feet high; the seeds are eaten both by the natives of India and by cattle.

European species, with which it closely agrees in habits and manners, some allowance being made for differences of climate and production. At the same time, until we have the opportunity of comparing a series of skulls, we must decline hazarding a decided opinion on the subject: the comparative shortness of the head in the Indian jungle hog, presents a point of dissimilarity between it and the wild hog of Europe.

John Drummond Hay, Esq., in his interesting work entitled *Western Barbary* (1844), relates several accounts of boar-hunting in that country, and also the story of a combat between a wild boar and a lion, as told him by an old hunter who had himself witnessed it:—

"In the days of my youth," said the Reefian* hunter, "when a black moustache curled where now you see the hoary beard of my winter's age, I seldom passed a night within my father's hut; but sallying out with my gun, laid wait for the wild animals which frequented a neighbouring forest. One moonlight night I had taken my position on a high rock which overhung a fountain and a small marsh, a favourable spot with our hunters to watch for boars who resorted thither to drink and root.

"The moon had traversed half the heavens, and I, tired with waiting, had fallen into a doze, when I was roused by a rustling of the wood, as on the approach of some large animal. I raised myself with caution, and examined the priming of my gun, ere the animal entered the marsh. He paused and seemed to be listening, when a half growl half bark announced him to be a boar, and a huge beast he was, and with stately step he entered the marsh.

"I could now see by the bright moon as he neared my station, that his bristles were white with age, and his tusks gleamed like polished steel among the dark objects around him. I cocked my gun, and waited his approach to the fountain.

"Having whetted his ivory tusks, he began to root; but he appeared to be restless, as if he knew some enemy was at hand; for every now and then, raising his snout, he snuffed the air. I marvelled at these movements, for as the breeze came from a quarter opposite my position, I knew I could not be an object of the boar's suspicions.

"Now, however, I distinctly heard a slight noise near the edge of the marsh; the boar became evidently uneasy, and I heard him say with a clear voice, for you must know they were formerly men, 'I hope there is no treachery.' This he repeated once or twice, and began to root.†

"Keeping a sharp look-out on the spot whence I heard the strange noise, I fancied I could distinguish the grim and shaggy head of a lion crouching upon his fore-paws; and with eyes that glared like lighted charcoal through the bushes, he seemed peering at the movements of the boar. I looked again, and now I could perceive a lion creeping cat-like on his belly, as he neared the boar, who was busy rooting, but with bristles erect, and now and then muttering something that I could not understand.

"The lion had crept within about twenty feet of the boar, but was hidden in part by some rushes. I waited breathless for the result; and, although myself out of danger, I trembled with anxiety at the terrible scene.

"The boar again raised his snout, and half turned his side to the lion; and I fancied I could see his twinkling eye watching the enemy. Another moment and the lion made a spring, and was received by the boar, who reared upon his hind legs. I thought I could hear the blow of his tusks as the combatants rolled on the ground. Leaning over the rock, I strained my eyes to see the result. To my surprise the boar was again on his legs, and going back a few paces, rushed at his fallen foe; a loud yell was given by the lion, which was answered by the distant howlings of the jackals. Again, and the ferocious boar charged till he buried his very snout in the body of the lion, who was kicking in the agony of death. Blood indeed flowed from the sides of the boar, but his bristles still stood erect, as he triumphed over the sultan of the forest; and now he seemed to be getting bigger and bigger. 'God is great!' said I, as I trembled with dread. 'He will soon reach me on the rock.' I threw myself flat on my face, and cried out, 'There is no other God but God, and Mohammed is his Prophet!' I soon recovered my courage and looked again. The boar had returned to his natural size, and was slaking his thirst in the fountain. I seized my gun, but reflecting, said within myself, 'Why should I kill him? He will not be of any use to me; he has fought bravely, and left me the skin of a lion, and perhaps he may be a Jin (evil-spirit).' So I laid the gun down, contenting myself with the thought of the morrow.

"The boar had left the fountain, and was again busied rooting in the marsh, when another slight noise, as of rustling in the wood, attracted my notice, and I could perceive the smooth head of a lioness looking with horror at the body of her dead mate.

"'What! treachery again?' said the boar in a low tone.

"'God is great!' said the lioness; 'but he shall pay for it. What! a pig—an infidel—to kill a lion! One spring, and I will do for him!'

* The inhabitants of the line of mountains between Ceuta and Oran.

† "In the habit," says Mr. Hay, "which is universal amongst the Moors of relating long conversations with lions, boars, and hyenas, a Moorish sportsman scarcely considers that he is dealing in fiction, for with him every variety of sound which a wild animal utters is translatable into good Arabic."—*Preface*.

Having said these words she advanced boldly. The boar stood prepared, grinding his teeth with rage. She paused, and again retreated to the wood, and I could hear her say, 'O God! all-merciful Creator! What an immense boar! what an infidel! what a Christian of a pig!'

" 'May God burn your great-great-grand-mother!' said the boar.

"On hearing the creature curse her parent she again stopped, and lashing her tail, roared with a voice that the whole wood re-echoed, and she said, 'There is no conqueror but God!'

"The boar stamped his hoofs and gnashed his tusks again with rage; his grizzly bristles, red with the blood of her mate, stood on end; then, lowering his snout, he rushed headlong against the lioness, who, springing aside, avoided the dread blow. A cloud came over the moon, but I heard every blow of the paw, and every rip of the tusk. There was a dead silence; again the cloud had passed and the heavens were clear, and I saw the lioness with her fore-paws on the body of the boar. I seized my gun, aimed at her head—that was her last moment.

"The morning dawned. I descended from the rock. The claw of the lioness still grasped in death the body of the boar. Many severe wounds showed that the boar had again fought bravely.

"The lions were the finest I ever saw, and I made good profit by that night's work."

"We were still applauding the old hunter's story, when a gaunt Arab, thrusting forward his bare and sinewy leg, exclaimed, 'Look at these scars, and keep in mind, oh ye faithful, and thou, O son of the English, that it is not only dogs that are wounded or killed in the chase of the boar.'

" 'Let us hear how you got them,' said the young mountaineer, the owner of the dog that had been killed (in a recent boar-chase).

" 'It is soon told,' said the man of scars. 'Some eight years past, during harvest-time, I was watching at night for a boar in a field of ripe barley near *Ras Ashacár* (Cape Spartel), and fired at a large boar who reeled and fell, but got up again and made away.

" 'At dawn of day I went to the spot where the animal had fallen, and finding marks of blood, I traced them to some brushwood in the centre of the field, which spot I ringed, and perceiving the animal had not gone away, I was thinking what might be best to do, my gun cocked in my hand, when I heard a rush, and before I could get my gun to my shoulder the boar was upon me; the gun was dashed out of my hand, and I expected every rip I received that my doom had been written. God knows how long this encounter lasted; the time seemed to be as an age.

" 'Finding no manner of escape, I slipped my

arms from the gelab, and escaped out, leaving the animal to vent his rage on my garment. I crawled off, but fainted from loss of blood.

" 'I did not recover my senses till I was found by my family, who carried me home to Mesnàna (a village near Tangier) half dead. I told my story there, and a party of hunters went out directly to revenge my wounds. They found the beast had again retreated to his lair, having cut my dress into shreds. He attacked them, as he had attacked myself, but they were prepared and soon killed him. I was not able to stand on my legs for many months after.'

" 'The son of the English,' said Sharky, pointing to me (*i. e.* Mr. Hay), 'had just such a narrow escape four years ago, when he and the son of America attacked a boar at bay.

" 'Let us hear,' said they all, 'O Nazarene!'

"I complied with their request, and suiting my style to my audience, told my tale much after the following fashion.

"It was in the month of October, O ye faithful children of the Prophet, and early in the morning, that I received a message from the son of America, who had passed the night in the hills watching for boars, begging me to join him at the marshes of Boobána as soon as possible, and to bring my hunter Sharky, with his two dogs and an *extra* gun. The messenger told me that my friend had wounded a large boar, and that while tracking him, the animal had rushed from the thicket, that his rifle had missed fire, and that had it not been for a ruined wall, on which he had taken refuge, he would have fared badly.

"I soon joined my friend, whom I found still perched on the topmost point of the wall waiting my arrival.

"The boar had moved off to some distance in the thicket. We soon got on the track of the beast, and found by the print of his hoofs that he was wounded in the right hind leg.

" 'At him *Merkis*!' said Sharky, as he slipped his dogs. 'Get out you Jew; there is only one God!' which the old hound *Zeitsoon* answered by *bow*; and the little cur *Merkis*, whose hide was striped like a zebra's from the rips of boars, yelped with joy as he got on the scent.

" 'That's he,' shouted Sharky; 'none but the one God!'

"The dogs had now headed us by some hundred yards, when we heard *Zeitsoon* give tongue as when the boar is at bay; and it was quite certain that this was a large one, for both the dogs seemed to be keeping at a respectful distance.

"I had scrambled through the thicket within some yards of the place where the dogs were giving tongue, and was calling to my companions to know where they were in case I fired; but the only answer I received, O ye faithful! was given

me by the boar, who was nearer than I imagined. Luckily I had kept clear of his path; so he dashed by within a few paces of me without my being able to get a shot, or he a rip. The dogs followed in full cry, and had reached an open space when we heard a piteous howl. Poor *Zeitsoon* had been almost severed in half. The boar, we supposed, had laid in wait for him in the open space.

"Sharky, when he saw the frightful state of his brave and faithful hound, sat down without saying a word, and taking his turban began to bind up the wound, whilst he offered up a prayer for the life of the poor dog.* The boar had now managed to make his way up the opposite bank, and little *Merkis*, heedless of his companion's fate, yelped on the track; when again a howl grated on our ears. Sharky started up on his feet, and brandishing his bill-hook, shouted to the full extent of his lungs, 'Hide yourself, *Merkis*; do not trust him, he is an infidel.'

"The dog showed he was not much hurt by still giving tongue, though in such a manner as told that the boar had again come to bay. Having called a council of war, my friend and I determined to go into the boar by ourselves, as more than two persons would only create confusion.

"The enraged beast had come to bay in a jungle of gum-cistus, entangled with briars, a very unfavourable place for our attack; however, having thrown off our sporting jackets and examined the priming of our guns, we entered the wood, agreeing to keep some few paces from each other.

"At first we made against the wind, and kept clear of the boar-paths, which is the best method of avoiding an unexpected attack. Having advanced some way through the thicket, I was obliged to return to a boar-path, for I found it was impossible to make way through the brambles, having already left most of my covering among the thorns.

"I moved slowly onward in a stooping position, keeping my gun as a battery in front; behind me walked an English setter, who being useless for partridge shooting, I was training for the nobler sport. The light hardly penetrated the dense jungle, so that I could not distinguish my com-

panion through the gloom, although I heard him advancing as cautiously as myself.

"At length I got within about fifteen paces of the spot where the dog was giving tongue. I knew I was in an exposed position, but could not avoid it, being unable to move to the right or left, the brambles were so thickly matted together. *Merkis*, encouraged by my presence, ran to and fro yelping bravely, but searched in vain to get a sight of the enemy.

"Can you see him?" said the son of America, who was some yards to my left. 'Hush!' I replied for at that moment I fancied I could hear the beast move. My setter now pricked up his ears, and rushed forward. It was the affair of an instant; for hardly had I fixed my gun to my shoulder, when I saw *Cato* pushed forward by the boar, and howling with fright.

"It was useless to fire, for such was their position that I should have killed the dog without hurting the boar. But the difficulty was soon removed, for the boar, throwing the dog behind him, was at once on the muzzle of my gun. I pulled both triggers, but the very instant that I fired my gun was dashed from my hand, and I and the enraged animal rolled together on the ground. I was undermost, and managed to keep my face downwards to the earth, lying as flat and as still as possible; the path of the boar being happily for me a small watercourse which had been worn away, so that the shallow trench somewhat protected me from his tusks. Having recovered from the shots, the monster began to belabour me with his snout; but being a little flurried, I suppose, could not manage to get a rip. I was in a terrible fright, and hollowed for assistance, expecting every moment to be in the same plight as poor *Zeitsoon*, whose dreadful wound flashed across my mind.

"My companion had now come up boldly to the rescue. 'Take care,' cried I, 'you don't put a ball into me.' *Bang, bang*, went both barrels. The boar left me and made at his new assailant; who, keeping his gun steady, and having the advantage of being in the thicket, was preserved from the awkward accident which had happened to myself. *Merkis*, seeing him in danger, boldly laid hold of the boar behind, and *Cato* was mustering courage, like myself, to assist him; when the boar, worried by *Merkis*, shook him from his hold, and turned after the dogs. *Cato* was again wounded. Having recovered my gun, which by the blow of his (the boar's) snout had been thrown from my hand, I requested my companion to examine me, and see whether I was injured, for I was covered with blood, and whether it was the boar's or mine I could not say, so completely had fear taken away all sense of pain. 'Load your gun,' was his cool reply, 'and then we will see what is the matter.'

* The affection of the Mogrebbin sportsmen for their dogs is remarkable, and during the chase of the boar, "they express their feelings in the most endearing terms; such as, 'My children, my dearest, take care, he sees you; he is an infidel, a Nazarene. He will have his revenge. None but the one God!'" On the occasion to which this passage refers, three dogs were wounded, one belonging to a young mountaineer mortally.

"The poor animal had just life enough to wag his tail and raise up his head as his owner, a fine young mountaineer, came up and took him in his lap. 'Alas! my poor dog,' he said, 'did I not warn you not to go near the infidel? but God's will be done.' The tears started in his eyes as his dog expired. The bill-hooks were set to work, and a grave was dug to bury the poor animal; each man put a stone upon it as a tribute of his affectionate regret, and I, on my part, added one to the number. The wounds of the other two dogs were now sown up, the thorn or point of the Aloe-leaf and its fibres being substituted for a surgeon's needle and silk thread."—*Hay's Western Barbary*.

"We now heard the hunters shouting to us from outside the wood to abandon the boar; they were certain he was a *Jin*, and that we should both of us be killed, or receive some dreadful wound. The dogs were giving tongue at some distance ahead of us, and again Sharky shouted, 'God is great!—get out, you black *Jin*!'"

"'Come,' said my cool friend, having examined me, and found I was only marked by the snout and hoofs of the pig; 'I calculate we will fix him this time. Let us keep together, however, and it is my turn to go first.' Finding that I was not quite killed, and roused by the tongue of the dogs, I again dashed onward with him into the thicket.

"'Do you see him?' said I, as we approached the dogs. 'Yes,' he whispered; 'make yourself easy, he is coming towards us.' I grasped my gun, and stooping abreast with him in the path, we awaited our foe's assault. He was white with age. Blood was streaming down his side. He did not appear to see us, but was watching the dogs. 'Now,' cried I, 'four barrels at once, and I think we can kill even a *Jin*.' We fired: the boar fell, got up, staggered, and again rushed gallantly towards us. The branches, which we clung to for safety, barely sustained our weight; my companion, who is a larger man than myself, sometimes swung as low as the snout of the boar.

"*Merkis* again called off the animal's attention, giving a sly snap and then retreating. The boar moved from us a few paces and we ventured to quit our trees. I had no balls left; my companion had but one, which he now fired, having put the muzzle of his gun almost to the animal's head; who though much weakened from loss of blood, was standing gallantly. As the son of America fired, the beast sank on his hind legs.

"We drew our knives, and, assassin-like, stole behind him. Fierce even in death, he tore with his teeth the bushes near him. Foam and blood gushed from his mouth; as we advanced he made a fresh effort, but at the same moment our hunting-knives were plunged in his heart.

"'Who-op—who-op!' we cried; 'the devil is dead!' *Merkis* said something to the same purpose. Poor fellow, he had received an ugly rip in the neck. We found every shot that had been fired had entered the body of the boar. The carcase bore eleven marks of our balls. We had great trouble to drag the bulky brute into the open field. He measured six feet four inches from snout to tail, and three feet three inches from shoulder to hoof, and though not fat, weighed above twenty stone. However, lean as he was, he yielded us some capital chops.

"Poor *Zeitsoon* was carried home, but never recovered his wounds, though he lingered many days.

"'There is no strength nor power but in God!' cried my audience."

Mr. Hay gives the details of other boar-hunts in Barbary; and from his account it would appear that this animal is very common, and commits havoc in grain fields and melon fields adjacent to dense woods or jungles, in which he secretes himself during the day. The result of one day's sport, near the hills of Shreewa, is noticed as having amounted to ten boars and six jackals.

Lieutenant-Colonel E. Napier, in his *Wild Sports in Europe, Asia, and Africa*, describes the chase of the wild boar in the plain of Esdraelon, at the base of the Naplouse hills (Syria), and he states this animal to be abundant in the extensive marshes which commence within a few miles of Jaffa. In Lower Egypt, within twenty miles of Alexandria, the wild hog in considerable numbers tenants the marshy lands, and the dense beds of reeds and jungle along the banks of canals. "The plains of Lower Egypt," says Col. Napier, "though at first sight presenting the most level unbroken appearance, occasionally offer obstacles which might puzzle a well-mounted Leicestershire man, who, though he would in vain search for a single ox-fence, five-barred gate, or bulfinch-hedge, might occasionally be brought to a stand-still by a dyke (too broad to clear at a leap) of stagnant water, soaking deeply into a rich black and loamy soil; by a continuous range of soft marshy rice fields; or, more particularly at the season when the land is in many places overflowed by the swollen waters of the Nile, by that most provoking and impassable of all stoppers, a dark, deep, and treacherous bog."

The following account of an unsuccessful hunt, will convey an idea of the difficulties to be overcome. Two of the party, horses and all, had already been immersed in the dark muddy water of a broad ditch, before the sport commenced. The narrative then runs on. "After traversing a few more rice fields and approaching the Barrieh, we began to despair of a *find*, when the suddenly increased clamour and rapid motions of the beaters announced something to be on foot; and presently above the waving rice, like the dark forms of the monsters of the deep, over the ripples of a summer sea, the well-known outline of an old acquaintance was first dimly viewed; and then, as the rustling herbage opened on his passage, and occasionally showed a portion of the black moving mass above even its highest undulating tops, no doubt remained on my mind of its being a boar and one of the first magnitude; but I proved mistaken in the former, though correct in the latter conjecture.

"Pistol-shots were discharged by our beaters; the shouts increased, and to the cries of El Hâlouf! El Hâlouf (the wild boar! the wild boar!) the whole of our myrmidons, now joined by numbers of Fellahs from the adjoining fields, pressed on

rapidly in pursuit, when suddenly they were all brought to a stand-still and showed evident symptoms of trepidation and dismay.

"The halouf, pursued through the cultivation to the borders of the Barrieh, now showed no disposition to take to the open country, which in a most inviting manner stretched for a couple of miles before him, but turning round stood fiercely resolute at bay, and appeared to bid defiance to the surrounding host, not one of whom dared to approach him, whilst the horsemen remained on the outside of the rice fields encouraging the beaters to drive him out of covert, and prepared to blood their glittering arms, as soon as he should step on *terra firma*.

"His appearance was, however, too formidable for the nerves of the timid Fellahs, and we remained some time thus in suspense, till at last seeing an Arab coming across the fields with a long rusty firelock, and fearing some mischief might be done, which would have spoiled our anticipated gallop, I ordered up the cavalry, which, making a circuit, entered the rice fields, and advanced in front of the then encouraged and reassured beaters.

"The pig, probably thinking we were coming it 'too strong,' with a most musical grunt now burst through the tall herbage, and instantly was bounding over the wide level plain, which for the distance of a couple of miles continued unbroken, until where a line of tall water-canes appeared to cross its extensive surface; and towards that point our friend directed his or rather her course, for it turned out to be an enormous *sow*, arrived at her full growth, but whose speed and vigour were nowise abated by that corpulency which both in man and beast is apt to stamp its weight on the years of maturity.

"This gentle specimen of the bristly race, though far from possessing the beauty or symmetry of the gazelle or antelope, appeared almost to rival those animals in speed; and notwithstanding our horses were all doing their best, well assisted with the spur and the sharp edges of the shovel-shaped iron stirrups belonging to our eastern friends, still she kept a long way ahead of us, and we gained on her little or nothing for the first mile, which, although over hard ground, was deeply indented with sun-cracks and yawning chasms, across which we thundered along, luckily without accident or mishap.

"From having got a better start than my companions, and perhaps a better horse, I had taken the lead, and maintained it, keeping the old Dongola at his very best speed. After a sharp burst of nearly a mile at this pace, I began to close with the chase, could hear the sobs of the distressed sow, and even see distinctly the white foam churning down from her wide opened and

steaming chaps. We had now gained about half the distance between the rice fields and the tall canes above mentioned, and which I concluded must border the banks of a canal. It was therefore of importance to bring the business to a close ere that point should be attained, and I stretched every nerve to effect this object. I was now close at the heels of the monster, the spurs were in my horse's flanks, my spear in rest, and a second more would have safely lodged its glittering point behind the high and bristly shoulder-blades, when the beast making a sudden turn at right angles, I was unavoidably thrown out. However my ally Smith was at hand. He made a dash which sent her back in the original course, and I was soon again close upon her, well raised in the stirrups, and straining forward to give the death-thrust. At this critical moment she floundered through a dark belt of deep marshy ground, which in our rapid course we had come on unawares. There was no time to pull up, and my horse from the top of his speed was instantaneously transferred to the top of his head, which firmly implanted him in the bog, caused me at the same time to make a somersault, luckily sending me clear of his over-rolling weight, and lodging my precious person, without injury or fracture, in the midst of a pool of fine fat and unctuous black mud. Some seconds elapsed ere I could release both myself and horse from this extremely unpleasant situation. Smith in the mean time spurred on, but the ground had now so completely assumed a marshy character as to render the odds greatly in favour of our antagonist, who succeeded in gaining the covert of canes above alluded to; and which on reaching we found to border a broad and deep canal. As we were pretty close up when our quarry had gained this shelter, and seeing no traces of her crossing the canal, we naturally concluded she was somewhere hid along its sedgy bank; and accordingly with Snow and the Bedouin Sheikh, who had by this time come up, immediately commenced a diligent search, which proving ineffectual, we determined on swimming the canal in hopes of hitting off her trail on the opposite side of the water.

"Our Leander-like exploit however produced no other result than giving us a partial cleansing; and at the end of a long and fruitless research we gave it up as a bad job, regained the banks of the Mahmoudieh near the village of El Birket, and at last reached our Kunjah, after a severe day's work both for men and horses.

"We continued for a couple of days longer at Abou-el-Kader, during which time we had several good runs, much resembling the one just described; but not succeeding in securing any heads or tusks, we shall not try the reader's patience by a further description of our failures. Suffice it to say, that

with better nags, and at a rather earlier season of the year, before the country is quite so much under water, capital hog-hunting may be had within twenty miles of Alexandria; to obtain which the sportsman has to go no farther than the villages of Abou-el-Kader or El Birket, on the banks of the canal." There is in fact excellent 'Hog hunting in the plains of Lower Egypt.'

At a subsequent period, the Colonel, on a visit to the shrine of St. Hubert, in a remote spot in the wilds of the Ardennes in Belgium (once the territory of William de la Marek, the boar of Ardennes—the Arden of Shakspeare, where Jaques did muse and moralise), naturally made inquiries respecting the bristly *sanglier*, formerly so common in these districts. He was informed that the race had become nearly extirpated by the exertions of three brothers of the name of Titeux, much to the satisfaction of the surrounding farmers, among whose scanty crops the *sangliers* used to commit dreadful havoc. Nevertheless there is much there to attract a lover of the chase—hares, deer, roebucks, partridges, &c.—while the rivers swarm with fish and crayfish; in severe winters, moreover, the wolf makes his appearance and devastates the flocks.

The same amusing writer, in another part of his work, gives the account of a contest with a wild boar in the Sierras of Andalucia in Spain.

In the vast woods of Lower Brittany the wild boar and the wolf abound; and many graphic scenes of boar-hunting are detailed by F. Tolfrey, Esq., in a work entitled *The Sportsman in France* (1841). On one occasion the chase had a most melancholy termination. Two boars had been killed in the woods belonging to M. de C., about twenty miles from Guingamp, and a third was wounded—one of the attendants incautiously approached the furious beast, intending to dispatch it, when the boar suddenly sprung up, rushed at the unfortunate man, and so dreadfully gored him, that he expired in the course of a few minutes.

Mr. Tolfrey, who appears to have been devoted to the chase, introduced from England four tremendous bull-dogs, besides a small pack of beagles—the former for the purpose of attacking the boar, the latter for that of beating up his lair; these formidable bull-dogs were respectively named Blucher, Boatswain, Boxer, and Belcher. As the beagles had to join a pack of French dogs of all sorts and kinds, it was determined that a trial (under an English huntsman) should be made in order to test their working; but this trial led to a fierce contest between the bull-dogs and a wild boar, which must have been no less novel than exciting to the French gentlemen and farmers who witnessed it. In giving the outline of this combat from the narrator's own account, we shall take the liberty of omitting all superfluous matter. "As

this little excursion was only by way of prelude to our future sport, and for the avowed purpose of bringing the dogs together, and to give them a taste of their vocation, we had prohibited the use of rifle or gun, for we only intended to give the dogs a run, nothing more.

"About two o'clock we were in the saddle, and bending our way to the woods, the little pack under the command of Collins the huntsman, with Blucher, Boatswain, Boxer, and Belcher, bringing up the rear. Arrived at the wood's side we were instructed each to take a bridle path, pointed out by the attendant guide, which we were informed would lead to the *grande allée*, and down which it would be his aim to drive the boars.

"Before we separated Collins and the guide departed westward, taking the hounds with them, and one of the bull-dogs (Boxer), which at our huntsman's request was allowed to accompany him. I deemed it prudent, under existing circumstances, to keep the other three with us. Blucher attached himself to Captain P., Boatswain to Mr. W., and the ferocious Belcher was consigned to me, the surly gentleman having evinced a decided partiality for my unworthy self, in consequence of my having on more than one occasion administered personally to his gastronomic propensities. With such a companion I felt perfectly safe, and he followed the heels of my horse as if we had been acquaintances of long standing. Groping one's way through a blind entangled path in an unknown forest, for the first time, and *unarmed* to boot, is by no means a pleasant operation, and I began to think there was no end to the one I had selected. After some misgivings, and a slight exhibition of impatience, I came to the *allée* in question. Here I was to wait until the guide and Collins set to work, but I was not kept long in suspense, for some cheering sounds reached me in a few minutes. I could distinguish the ho, ho, ho's and the ti, ti, ti's of the guide, and a French amateur in the shape of a farmer, who, with a pole and a spear at the end of it, was following on foot; nor was Collins behind hand, with his companions; and his national 'hark forward,' and other English notes of encouragement, were more intelligent and musical, to my ear, than the continental jargon. The dogs, however, not being all of a sort, some French and some English, the admixture of languages was admissible; at all events they seemed to understand it, for Collins told me in the evening they worked admirably well together.

"They were now in full cry, and giving tongue beautifully, so that I was on the look-out for a boar or two, for I was certain our pack had started the game.

"I now bitterly repented not having brought our guns or rifles with us, for independently of my anxiety to get a shot at the boar, the idea struck

me. of the impolicy of paying the woods a visit without weapons of defence. I contemplated the possibility, in fact the probability, of the dogs leaving us in quiet possession of the forest, while they followed their boar. Killing one I considered quite out of the question, and how the dogs were to be called off I knew not; all hope I conceived would be at an end unless the swine should take to the plain, but where that plain was, I could not tell: these unpleasant reflections were interrupted by a very perceptible undulatory motion within a few yards of my resting-place.

"I was gazing in breathless anxiety at this point, when a splendid *chevreuil* bounded into the riding, and passed me at a rail-road pace. By this time the dogs were nearing my post very rapidly, and my pugnacious comrade Belcher was manifestly becoming impatient for a prey of some kind or other, an impulse by no means diminished by the sudden and startling appearance of the *chevreuil*. I know not which, the master or the dog, was the more anxious of the two; I felt myself approaching fever heat, and dismounting, gave my horse to the boy at my side to hold. I had scarcely done so, when an indescribable sound, accompanied by an awful rustling noise, portended some adventure. The dogs were close upon us; in an instant a fine boar rushed from the thicket and passed close before me. I had scarcely recovered from my surprise ere Belcher had tackled him, and was hanging to his haunches. Calling him off was out of the question, and the peculiar method resorted to by dog-fanciers in the Westminster pit, of insinuating the tail between the *dentes molares*, was rather too dangerous an experiment to resort to on the present occasion.

"It is to be presumed, that the boar liked not so pertinacious an assailant as my friend Belcher, who clung to his hind quarters with a praise-worthy ardour; the swine waxed wroth, to which I should imagine the gentle pinches of the canine jaws contributed in no slight degree; the assailant was not to be shaken off, and as the boar's power of progression was thereby impeded, he drew himself up and prepared for mischief. It was an anxious moment, and I would have sacrificed half my worldly goods to have been armed with my trusty rifle.

"At this critical juncture, the pack appeared in sight, and to my indescribable joy Collins, Boxer, the guide, and the amateur with his spear; but during the short moment I had turned from the contending quadrupeds to the approaching succour, a change, and a fearful one too, had taken place between the belligerents—the assailed had become in his turn the assailer, the boar was giving poor Belcher a taste of his tusks, and I was apprehensive of mischief, for however great the strength and courage of the dog, I was fearful that his

temerity might prove fatal against so formidable, and at the same time, so novel a foe.

"I called to the guide, and implored of him to make use of the amateur's weapon, in order that the boar's attention might be diverted from the dog; at the same time, I must confess, I hardly anticipated a very ready compliance with the request, but, to my surprise as well as pleasure, he manfully walked up to the bristly monster and buried the spear in his chest.

"Boxer also ran to the rescue, and pinned the brute most gallantly; and Belcher, gathering fresh courage at this timely assistance, and although severely lacerated in his hind quarters, took the opportunity of releasing his hold, for the purpose of securing another in some more vulnerable part; he had already felt the boar's tusk, which made him rather wary.

"As soon as the *sanglier* got a touch of the spear, his attention, as I suspected, was directed to our guide, and Belcher with an instinctive cunning embraced the opportunity afforded him of seizing his antagonist by the wind-pipe, keeping his fore legs under him in such a manner, and so closely to his own body, as to preclude the possibility of the boar taking undue liberties with them. The scene altogether was highly exciting, and I regretted that Captain P. and Mr. W. were not within call, as I could have wished them to witness the *scrimmage*.

"A fearful struggle now ensued between the guide and the boar, and had it not been for the aid afforded by Collins in enabling his companion to keep fast hold of the spear, the issue of the contest might have been doubtful; but two pair of arms keeping the steel buried in the chest of the animal, to say nothing of the powerful gripe of the wind-pipe so zealously maintained by Belcher, were too much for the now prostrate hog. His strength was failing him fast, and it was evident he must soon bite the dust.

"Although not in immediate contact with the enemy, my share in the proceeding was by no means an inactive one; for I was engaged in flogging off the hounds, and no easy task either, they being one and all eager to share the danger and afford their assistance, and had it not been for Collins' massive hunting-whip, their interference might have done mischief. It was desirable to check their ardour in this particular, for in the event of their running into another boar without a bull-dog or two to back them, the chances were the pack would have been reduced considerably in number, inasmuch as a hound has not the slightest chance against the formidable tusks, which, according to Mr. Collins' recorded opinion, are the *penetratingist things* as is.

"The boar lay at his last gasp, though still defending himself nobly against his aggressors; we

were now joined by Captain P. and Mr. W., who, surprised at the delay and the unusual baying of the hounds, which continued fixed in one spot, determined upon leaving their posts to ascertain the cause. I was pleased to see them come cantering up the *grande allée* with Boatswain and Blucher at their heels. These latter allies did not require much persuasion to join in the affray, for they no sooner saw their canine companions at close quarters with the unclean monster, than they lent their powerful aid, although late in the field, to finish the work so courageously begun. With such a reinforcement the boar's fate was soon decided, and by way of *coup de grace* Collins dexterously drew his clasp-knife across the jugular, whence the stream of life ebbed in gushing torrents.

"The next duty to be performed was the examination of our faithful dog. Poor Belcher had suffered severely in the struggle; his hind leg had been dreadfully lacerated, I should say by a bite, but the worst wound was on the shoulder; he had been awfully ripped, and the gash was frightful to look at. Even in this crippled state we had the utmost difficulty in disengaging him from the object of his fury. There are plenty of dogs to be found in France that will *hunt* the boar, but few will *tackle* him. The English thorough-bred bull-dog is invaluable, and I might add an indispensable companion to the boar-shooter, and should any of my countrymen be induced to run over to Brittany, I strongly urge them to take one, if not two, of these faithful animals with them."

We will give another amusing extract, somewhat condensed, from the same work, and then close our accounts relative to the chase of the wild boar.

"On arriving at the wood side, each *chasseur* was directed to his station, with a *piqueur* or a *garde de chasse* to accompany him: our host's keeper was allotted to me, and a very efficient ally I found him. Blucher, Boatswain, and Belcher were handed over to Captain P., Mr. W., and myself; the latter was quite recovered, and he looked as if he meant mischief as he followed to the scene of his late disaster. Our huntsmen Collins took Boxer with himself as before, and departed with our pack and the guide to the western boundary of the forest, in order that the game might be driven down to us. Before the pack had given us their welcome music I had reconnoitred my position and visited my countrymen, who were stationed about three hundred yards from me each way. I knew our rifles to be good, and was also convinced that there were cool heads and stout hearts to back them; so I felt secure as to my neighbours. Captain G. from Rennes had also a good rifle, but he had followed the dogs, being more anxious to see them work than wait for a chance shot.

"I shall not easily forget the sensation I experienced when I heard our gallant little pack in full cry. The pace, I was told, was terrific, and the result in some degree bore out the assertion, for they neared us very perceptibly indeed.

"A shot! another, and another! A dark object was presently discernible coming down the *grande allée*; but he galloped not straight; he reeled; in a few seconds he was within a few paces of me, a deep and purple stream was gushing from his side, but still he fled from his unrelenting pursuers, as fast as his strength would allow him. As he passed me I sent so sharp a messenger that he was fain compelled to obey the summons, a death-like sound of agony escaped him, he staggered, fell, and died on the spot. He was a fine plump boar about three parts grown.

"My *garde de chasse*, whose shoulders were ornamented with a huge hunting-horn, now sounded the death; and presently the pack were with us, the guide and Collins followed soon afterwards, and we were also joined by three or four more of the party. A French gentleman claimed the honour of having first hit the boar, to which distinction I believe he was justly entitled; but Captain P. on my right hand had also perforated his side, for there were two wounds besides the *quietus* I had given him. Our friend Belcher took a very satisfactory sniff at the fallen swine, which was deposited at the foot of a tree close to my *garde de chasse*.

"Try back!" was now the word. Collins and the guide retraced their steps, while the dogs were casting wistful glances from under their ears at the dainty morsels they were leaving behind. In somewhat less than an hour the dogs gave us to understand that it was time to be on the *qui vive*; they had found, but to my disappointment the cheering sounds grew fainter and fainter, a proof that the game was not making for our immediate neighbourhood. A shot was presently heard; and immediately afterwards the death-note of our guide's bugle announced that some havoc had been committed. We afterwards heard that Captain G. had been the successful *tireur* on the occasion; he had obtained a fair shot at a boarling, and killed him in a very sportsmanlike manner.

"The dogs were soon at work again, and making in our direction. On looking westward to my right up the *grande allée*, I perceived something like a cloud of dust, rather an unusual sight in the forest, but which eventually proved to be the sand, and which was kicked and scattered about in all directions, by some seven or eight infantine boars who came frisking towards me, apparently enjoying their gallop.

"My friend Captain P. I knew would not allow so good an opportunity to escape him, and the sharp and stinging report of his rifle soon con-

firmed the opinion. As a reward for his coolness and skill one of the young squadron remained behind; the rest, little heeding their fallen comrade, came cantering down to us at a tolerable smart pace, and when they were opposite to our stand the *garde de chasse* and myself let fly at them; the result was one killed and one wounded; the latter endeavoured to follow his scared brethren, so I sent my friend Belcher after him, and a famous tussle they had, but it did not last long, the dog had all but choked him, when the *garde de chasse* finished the business.

"This prudent aid-de-camp of mine begged me to load as soon as possible and to look out for the *père* or the *mère*, as he was convinced the 'sounder' could not be far off. Dragging therefore our diminutive prize after us, we made all due preparation for the reception of the old hogs.

"We were screwing our courage to the sticking place, when a shot on our right from Captain P. caused our pulses to beat in double quick time. We were not long kept in suspense, for the sow soon made her appearance, and in no gentle mood either. Captain P. had hit her, and besides, her wrath had in all probability been excited by the desertion of her young fry.

"I had not much time left me for philosophizing, as the sow, having stolen a glance at us, seemed disposed to wreak her vengeance on our persons. As this was a consummation by no means desirable, I saluted her with the contents of Mr. Moore's inimitable rifle. I hit her in the chest, of which pleasing fact I was not so well assured, for as I fired she made a rush at me which impended mischief; but just as I was preparing to cede the right of way to her, she staggered and fell a few yards from me.

"Mr. Belcher as usual was very anxious to show fight, and viewed with a suspicious eye the advances of the enraged animal, and just before she fell he charged her and sprang at her throat. I was apprehensive that the gallant dog might sustain a second injury, for the sow's tusks were formidable to look at, and although unable to run, she was good at close quarters against any antagonist.

"I ran to my tree for my reserve gun, and flew to the rescue of the pugnacious Belcher. He had placed himself rather awkwardly, at least for my purpose; for, in the position he had taken up, I was fearful of hitting him as well as the old sow. After some little dodging, I seized a favourable opportunity, and shot her through the body.

"My *garde de chasse* then attacked the foe in the rear with a hatchet, and, after several well-directed chops on the pericranium, the savage beast was done for. The *garde de chasse* then proceeded to persuade Belcher, *à la mode Anglaise*,

to let go his hold. I assisted also, and was squeezing his throat with as strong a gripe as I could command, while the Frenchman was munching his tail.

"This occupation so entirely engrossed us that we heard not, I presume, the approach of the boar. The nether end of the *garde de chasse* faced the advancing animal, which rushed furiously between his legs, but fortunately without doing him any injury. Lucky was it for him also, that he had a capacious stride, and that he was stooping at the moment, otherwise he must have been seriously injured. By this rude shock the *garde* and myself were both upset, and Belcher released from his hold. The unexpected visitor seemed for the moment as disconcerted as ourselves; for there lay the sow dead, and covered with gore, and surrounded by strangers.

"I had been told that a boar would run at and gore a person, but would never face about and attack any one after the first rush. I can say that this one was an exception to the rule; for he made a desperate run at Belcher, who sprang at but missed him.

"I had a bullet still left in one of my barrels, but I must confess I was a little off my guard; the suddenness of the attack in the rear, so wholly unexpected, and the jeopardy my poor dog was in unnerved me for the moment. I picked up my gun; however; and, as the brute was preparing to give Belcher a taste of his terrific tusks, I lodged a bullet under his shoulder. He turned about, and seemed rather astonished, especially when the gallant dog made a spring at his throat; but at the same instant the boar ducked his head, and Belcher found himself upon the animal's neck and shoulders.

"I trembled for the dog, as I feared he would not get any hold; and how he held on I know not. The boar, by no means satisfied with his reception, made down the *grande allée* towards Mr. W., the *garde de chasse* and myself following, as we were both anxious as to the fate of Belcher.

"We were soon overtaken by the pack, which were in full cry, and altogether the scene was intensely interesting. I was certain my friend W. would give the boar his *quietus*, if he could obtain a shot without risking the life of the dog; and, to my infinite delight, I heard immediately afterwards the report of the rifle, and the chorus of the dogs led me to hope that the shot had taken effect.

"I do not remember at any period of my life to have run three hundred yards in so short a space of time. The reader may imagine my gratification, on reaching the spot, to find the boar at bay, with Boatswain at Belcher's side, and the pack surrounding the combatants. Mr. W. had shot this troublesome customer in the thigh, and

broken the bone. The two bull-dogs *tackled* the savage swine with the most determined ferocity, and our guide and the *piquer* had now an opportunity for the display of their prowess, and, to their credit be it recorded, they acquitted themselves with commendable courage. The guide was the first to advance, spear in hand, and, taking advantage of the boar's undivided attention to his canine assailants, manfully drove his spear under the boar's shoulder.

"This application of cold steel was by no means relished; for the already enraged animal became absolutely frantic, and was evidently making himself up for mischief. Gathering together, therefore, all that remained of his strength, he made a desperate rush on his three available legs at two or three of the *piqueurs*, who were anxiously looking on. These functionaries nimbly stepped aside to avoid the collision, but in doing so they jeopardized the limbs of their companions in the rear. Mr. W. had a very narrow escape; for the boar brushed past him in no very gentle mood, and would have injured him severely had not his activity saved him from a fearful laceration.

"A corpulent rustic was less fortunate. The exasperated brute having missed giving Mr. W. the benefit of his tusks, caught Jean Marie Grosjean just above his dexter calf, and gored him in a most determined manner; and had it not been for the presence of mind and promptness of action on the part of our guide, the misadventure might have turned out of a more serious nature. In an instant his spear was buried between the boar's shoulders.

"My aide-de camp, who had remained by my side, as quickly lent his assistance, and put an end to the contest by severing the brute's jugular with surgical skill. Our dogs had behaved nobly, never leaving their hold for a moment; and it will be remembered that Belcher had ridden on the neck of his adversary for upwards of two hundred yards. Our pack of hounds now began to manifest considerable impatience for their share of the spoil. As soon, therefore, as the *dogues Anglais*, as Belcher and his brother bulls were called, could be shaken off (no easy matter, by the way), the guide expertly disembowelled the animal, and the much-coveted entrails were given to the hounds.

"This said boar, which had afforded us so much sport, and defended himself so nobly, was of gigantic stature, and the largest we had ever killed. Our attention was now bestowed upon Jean Marie Grosjean, whose leg had been so frightfully gored. We sacrificed a few pocket-handkerchiefs, which, being torn into strips, served admirably for bandages. While I was binding up the wound, one of the idlers was dis-

patched to the chateau for a pony, to convey the sufferer up to the house, and thence to Rennes in a cabriolet.

* * * * *

"Once more the cheering sounds of the tuneful pack in full cry reached us, and a good look-out did we keep. A splendid *chevreuil* (roe-buck) bolted out of the thicket, fifty yards above my stand, and landed in the middle of the *grande allée*. He seemed undetermined at first which way to turn, but to my satisfaction he decided upon facing to the right. The utmost caution was now necessary; for the slightest movement on my part, or that of my companions, would have marred everything—a whisper even, and our *chevreuil* was lost for ever.

"I hardly ventured to breathe, it was a moment of such intense anxiety. The beautiful animal stopped once before he reached the narrow path, listening to the fast approaching pack. One bound, and he was abreast of me. I was lucky enough to get a good aim, and it proved to be unerring.

"The *garde de chasse* ran to the spot with the laudable intention of dragging the noble roebuck to our stand; but he little anticipated the interruption which was awaiting him. I have said that the pack was nearing us before I brought down the *chevreuil*: it would appear that they were on the track of another boar; for before I could warn my aide-de-camp of his danger, two boars were within a few feet of him. I was taken as much by surprise as himself; for, in watching his movements, I had neither heard nor seen the swine coming down the *allée*. It was too late when I did discover them; for I could not fire, from the position in which I stood, without the probability of hitting him. I hallooed at the top of my voice, but my breath was wasted, and my feelings were anything but enviable.

"I had scarcely recovered from the effects of the first accident, and here was almost a certainty of a second happening. The reader may, therefore, form some faint idea of the pleasure I experienced when François, my *garde de chasse*, had escaped the impending peril.

"True to their savage custom, the boars had made a desperate rush from the rear at François's spindle-shanks, and he may thank his leanness for having got off with only a scratch. He was thrown off his equilibrium, and fell, but in a trice was on his legs again, and scampered back to his old quarters at my side. The fallen *chevreuil*, however, had his ribs and chest perforated and torn, but this was all. The brutes had vented their spleen upon the carcase, and were making off at the top of their speed.

"I had barely time to give them a parting salute, and hit the hindmost. This was subse-

quently ascertained; for Mr. W. killed him as he was skulking out of the wood. The hounds by this time had reached my stand, and were running breast high. Checking them was out of the question, so I desired Collins to run on with them at his best pace as far as Mr. W.'s post, when he would find the object of his pursuit dead at the edge of the covert. Captain G., with our two French allies, now came up, and from them I learned that on the occasion of the extraordinary delay which had previously occurred, two of the hounds had been ripped up by a boar wounded by Captain G.

"He had turned the animal over, and the hounds, heedless of the consequences, had advanced within reach of his formidable tusks. Two had paid the penalty of their rashness; one was already dead, the other past all hope of recovery. This was a serious loss, for our pack was not a very extensive one. Upon hearing this intelligence, I resolved on putting an end to the day's chase. One of the *piqueurs* who had accompanied Captain G. was desired to sound, not exactly a retreat, but some intelligible discord which would bring our friends around us, and a lad was sent off to a farm-house, not very far from the entrance of the forest, for a cart to convey home the game."

The wild hogs of the forests of Lower Britany do much damage in the adjacent cultivated grounds; consequently the farmers rejoice in their destruction, but the French gentlemen are not so much under the influence of the *amour de chasse* as are English sportsmen; and this is, perhaps, one reason why the wild hogs are still so abundant in many of the forests.

The foregoing details will serve to convey a clear idea of the dangers of boar-hunting, and of the modes in which it is practised—whether on horseback with spears, or on foot with rifles. We might, indeed, add many more narratives of the same kind; but we have said enough on this part of our subject. Those who wish for further information will do well to peruse the works from which our extracts are taken, and in which they will find much to amuse and interest them, not only as respects the wild boar, but other animals of the chase—the tiger, the bear, the wolf, the deer, &c.—with which we have no present concern.

Desmarest gives the following as the dimensions of an old and large European wild boar:—Length of the head and body to the root of the tail, 5 feet 9 inches (French); height at the shoulders, 2 feet 3 inches 6 lines; height at the loins, 2 feet 6 inches 3 lines; length of the ears, 5 inches; of the stem of the tail, 10 inches 4 lines.

We have said that in South America and Mexico the two species of peccary represent the

wild swine of the older continents; in North America (excepting in Mexico), there are no indigenous species of the hog tribe; nevertheless as the horse and the ox have become feral, troops and herds leading a life of independence, so likewise the hog, originally imported from Europe, has also emancipated itself to such a degree that in various districts numbers of these animals are to be found, perfectly free and wild in their habits. They congregate together, and are fierce, gaunt, and grizzly; and though they bear about them, in the smallness of their tusks and the inferiority of their stature, the insignia of their degeneracy from the forest boar of the old world, grim, sullen, and dangerous, they are sufficiently formidable, especially, as is generally the case, when numbers act in concert, and rush all at once upon their aggressor. That Europe should give wild or feral animals derived from long domesticated races to America, is one of the most remarkable facts connected with the history of animals. Not only has America received the domesticated species above enumerated, but also the rabbit, which abounds in the Falkland Islands, and of which parti-coloured specimens were brought home by Mr. Darwin.*

These specimens we have personally examined; they exhibit in all points the characters of our ordinary tame rabbits.

Returning to the feral swine of the New World, it may be observed that various travellers have given accounts of them in their published narratives. Mr. Waterton in his wanderings met a herd as he was passing overland from the Essequibo to the Demerara. One of the natives in his company got his bow ready to let fly at one of them a poisoned arrow; the weapon entered the cheek-bone and broke off, the hog was found quite dead about a hundred and seventy paces from the place where he had been shot. His flesh proved excellent.

In a paper on the natural history of Washington county, Ohio, in *Professor Silliman's Journal*, we are informed that large numbers of hogs pass the winter in the woods there, as independently as the deer or the bears, and subsist on fallen mast, acorns, &c. Single individuals sometimes fall a prey to bears or wolves, but ten or twenty hogs, in a gang, acting on a system of mutual defence, are more than a match for the wolf or jaguar, which often fall in the combat. It is stated that an old hunter had once an opportunity of witnessing a contest of this kind. He saw a large panther (jaguar) spring from a tree into a drove of wood-hogs who were aware of the approach of their enemy; scarcely had he touched the ground, when the large hogs

* This feral rabbit, be it observed, is the *Lepus Magellanicus* of Lesson, which he states is abundant on the Malouine Islands (Falkland Islands), and which, as he adds, was observed by Magellan in 1520, on the borders of the strait which bears his name. There can be no doubt that it is the common rabbit, transported most probably from Spain.

fell upon him with their tusks, and the weight of their bodies, and killed him and tore him to pieces in a few minutes.

In many parts of America, vast herds of pigs, which cannot be called feral, are kept in the woods during the greater part of the year, where they feed on various fruits, roots, and whatever they can pick up. Such was once the practice in our island before the great forests were cut down, and is so still in Portugal.

Feral swine are abundant in the woods of Columbia, and their flesh is preferred to that of the domestic breed; they afford not only sport but profit to the hunter. According to Mr. Cochrane (Columbia) these animals are often very dangerous, and he gives the following account of a tragical circumstance which occurred in Columbia. A party of six hunters, who were out on a sporting excursion, fell in with a herd of swine, upon which four of the company, of less experience than the others, immediately fired. This rash act roused the herd, the whole of which advanced fiercely to the attack. The four young men took to flight in great alarm, without warning their companions, or even considering in their fright the danger to which the two men were exposed. The latter were quickly surrounded by the swine, the fugitives having climbed up into some trees, and thus gained a place of security. The two men made a long and desperate defence with their lances, but were at length dragged down; one of them was torn to pieces, and the other dreadfully lacerated and left for dead by the swine, who now watched the four fugitives in the trees until sunset. At last, urged perhaps by hunger, they retired; the surviving hunters then came down, and assisted their wounded companion into the canoe, carrying off also the remains of the unfortunate man who had fallen in this horrible encounter.

There are many herds of feral swine in Brazil and Paraguay, and also in the Falkland Isles, where feral cattle, horses, and rabbits are numerous.

Leaving the wild hog, and the feral or emancipated races which have sprung from the domestic stock, let us direct our attention more immediately to that breed which, time immemorial, has been reared in captivity, and valued for the sake of its flesh, prepared in different ways as food for man.

"One of the most singular circumstances," says Mr. Wilson (*Quarterly Journal of Agriculture*), "in the domestic history of this animal is the immense extent of its distribution, more especially in far removed and insulated spots inhabited by semi-barbarians, where the wild species is entirely unknown. For example, the South Sea Islands, on their discovery by Europeans, were found to be well stocked with a small black-legged hog; and the traditionary belief of the people, in regard to the original introduction of these animals, showed that

they were supposed to be as anciently descended as the people themselves. Yet the latter had no knowledge of the wild boar or any other animal of the hog kind, from which the domestic breed might have been supposed to be derived. The hog is in these islands the principal quadruped, and is more carefully cultivated than any other. The bread-fruit tree, either in the natural state or formed into sour paste, is its favourite food, and it is also abundantly supplied with yams, eddoes, and other vegetables. This choice of a nutritive and abundant diet, according to Forster, renders the flesh juicy and delicious; and the fat, though rich, is not less delicate to the taste than the finest butter. Before the missionary labours, which have proved so successful in those once forlorn and benighted regions, had substituted the mild spirit of Christianity for the sanguinary forms of a delusive worship, the Otaheitans and other South Sea Islanders were in the habit of presenting pigs at the *morais*, as the most savoury and acceptable offering to their deities which they had it in their power to bestow. They covered the sacred pig with a piece of fine cloth, and left it to decay near the hallowed spot."

The pigs of these islands are evidently of the Cochinchinese or Siamese variety, or at least are closely allied to it, and were no doubt introduced at some remote period by the colonists of Malayan origin. Cook found the fowl as well as the hog at Ulitea and others of the Society Islands.

It has been doubted, and not without some reason, whether the domestic breed, so widely spread, is in every country attributable to the same specific origin. Certain it is that the various domestic races offer marked distinctive peculiarities, and if Mr. Eyton be correct, differences not only in the length of the snout, size of the ears, and symmetry of the body, but also in the number of the vertebræ of the spinal column. In the *Proceedings of the Zoological Society* for February 28th, 1837, p. 23, will be found the following observations by T. C. Eyton, Esq., on the osteological peculiarities to which we have alluded:—"Having during the last year prepared the skeleton of a male pig of the pure Chinese breed, brought over by Lord Northampton, I was surprised to find that a very great difference existed in the number of the vertebræ from that given in the *Leçons d'Anatomie Comparée*, vol. i., ed. 1835, p. 182, under the head either of *Sanglier*, or *Cochon Domestique*. A short time afterwards, through the kindness of Sir Rowland Hill, Bart., M.P., I prepared the skeleton of a female pig from Africa; this also differed, as also does the English long-legged sort, as it is commonly called.

The following table will show the differences in the number of the vertebræ in each skeleton with those given in the work above quoted:—

Vertebræ.	English Male.	African Female.	Chinese Male.	Legon d'Anat. Comp. Sanglier	Coch. Dom.
Cervical	7	7	7	7	7
Dorsal	15	13	15	14	14
Lumbar	6	6	4	5	5
Sacral	5	5	4	4	4
Caudal	21	13	19	20	23
Total	55	44	49	50	53

"It is possible that some of the caudal vertebræ may be missing.

"The Chinese was imported into this country for the purpose of improving our native sorts, with which it breeds freely, and the offspring are again fruitful. I, this winter, saw a fine litter of pigs by Sir Rowland Hill's African *boar*, imported with the female I described, the mother of which was a *common pig*; time will show whether they will be again fruitful.

"From what has been stated, the result appears to me to be, that either the above three pigs must be considered as distinct species (and which, should the offspring of the two latter again produce young, would do away with the theory of Hunter, that the young of two distinct species are not fruitful), or, we cannot consider osteological character a criterion of species.

"I have been induced to offer the above, not with any desire of species-making, but of adding something towards the number of recorded facts, by which the question what is a species must be answered."

Here we may be allowed to repeat our own observations on this subject which have appeared elsewhere, and which we may preface by stating our opinion, that closely allied species *may* produce offspring fertile *inter se*, although we have no proof positive of the fact in the case in question; for "when domestication produces decided differences of external form, we see no reason why it should be difficult to admit of the extension of the differences to internal parts also, and especially to the osseous frame-work, on which the form and symmetry of the body so greatly depend, or why the law of variation should be confined in its influence to one part, and restricted from another. If it be admitted that the bones may be somewhat modified in length or stoutness, we see not why it is that a numerical variation in the bones of the vertebral column should be so great a stumbling-block, especially seeing that accidental (and perhaps hereditary) variations are far from being uncommon both in men and others of the mammalia. We can easily conceive that a portion of the osseous system, offering in almost every species of quadruped some variation in the number of its constituent parts, should be also the most likely to exhibit such variation, where a species long subjected to the modifying influence of human control has branched out into various breeds or

racés, distinguished by decided external characteristics. It would be interesting and important to know whether the numerical ratio of the vertebræ, as given in the foregoing table, is constant in each race; and also whether the same variation does not obtain among others of our domestic animals divided into numerous breeds or races, as the dog, the sheep, and the goat. The subject has not been treated so fully and extensively as it deserves. With respect to the caudal vertebræ, indeed, we know that they are subject to great numerical variation in most of our domestic animals; witness the dog and even the common fowl, of which latter, a tail-less breed, perpetuated from generation to generation, is far from being uncommon. What takes place in one part of the spinal column may, we conceive, occur also in another and more important portion, to some if not to so great an extent; and the modification may moreover be transmitted from one generation to another."

Examples of extraordinary modification in other parts of the skeleton, transmissible from generation to generation, may be here adduced in confirmation of our views. Aristotle notices a race of hogs with undivided toes, or rather with hoofs consolidated together; and Linnæus informs us that a similar variety of the hog is not unfrequent in the neighbourhood of Upsal in Sweden. A still more extraordinary case of modification of the osseous framework, is recorded in the *Proceedings of the Zoological Society* for 1833, p. 16, where will be found the notice of a race of pigs with only two legs, the hinder extremities being entirely wanting. The communication, with drawings of two individuals, was made by Colonel Hallam, who states that these animals were observed "at a town on the coast in the Tanjore country in the year 1795; they were from a father and mother of a similar make, and the pigs bred from them were the same." Thus, then, accidental malformations, either by excess or deficiency, may become transmissible, and so perpetuate themselves.

The sentiments of a writer in the *Penny Cyclopædia*, on the subject of the osteological differences observable in domestic swine, are much in accordance with our own. Undoubtedly, he remarks, such records as those given by Mr. Eyton are valuable, but he thinks that the inference is precipitate, adding that John Hunter's theories are not so easily done away with, and that osteological character will continue to be a criterion of species notwithstanding the differences set forth. He goes on to say, "By the term *pig* we understand the African and Chinese varieties of the hog. *Phacochoerus* cannot be meant, or it would be stated. The pure Chinese breed was imported long ago, and for years its stock, bred from its union with our English varieties, has been known

in our farm-yards. The varieties bred by man from the wild hog, are spread all over the world in a domesticated state; and there is no more reason to doubt that the result, a union of an African pig with an Hampshire hog, would be fruitful, than that a breed composed of the Berkshire, Chinese, and Neapolitan, would produce a good litter. Now if we take little or no note of the differences in the caudal vertebræ, for the reason assigned by Mr. Eyton among others, what remain? Differences not exceeding two in the dorsal vertebræ, two in the lumbar vertebræ, and one in the sacral vertebræ, after a course of domestication no one knows how long. We know what breeding will do with dogs. Take a greyhound and a true shepherd's dog, for example, to say nothing of tail-less cats. We know what it will do among poultry; it will take away the drooping feathers of the cock's tail in those bantams known to fanciers as hen-cocks (Sir J. Sebright's breed), and remove the tail-feathers altogether (Rumpless Fowls); whilst in the top-knotted varieties an osteological difference is produced in the cranium. Man has occasionally an additional lumbar vertebræ. This accidental excess was first detected in the negro, and was laid hold of by those who would have made him a different species; but by and by they found a white man with one more vertebra than he ought to have had, and wisely said no more about it."

We have then no solid or sufficient grounds for believing that, widely as the domestic hog is spread, and remote and insulated as are some of the localities in which it has been discovered by voyagers, it is derived from different sources; although, as we have shown, there are more wild species of the restricted genus *sus* than zoologists formerly suspected. In making these remarks, we may add, that as to every general rule there are exceptions, so some are to be found here. The Papuan hog, caught and reared in captivity, is distinct (see *Sus Papuensis*, p. 395), and it is probable that the domestic hogs of Borneo, and of some of the islands adjacent, are derived from the wild races there indigenous. Be this as it may, we do not mean to insist upon the fact; our subject is the ordinary hog, as we see it in its state of contented domestication in Europe, and especially our own country.

At what period the hog was reclaimed, and by what nation, we cannot tell. As far back as the records of history go, we find notices of this animal, and of the use of its flesh as food. By some nations it was held in abhorrence, and prohibited as food, while among others, its flesh was accounted a great delicacy. By the Mosaic law the Jews were forbidden to use the flesh of the swine as food—it was unclean; and the followers of Mohammed, borrowing their ritual from the institutions of Moses, hold the flesh of the hog in utter abhorrence. Paxton, in his *Illustrations of Scripture*

(vol. i.), says, "The hog was justly classed by the Jews among the vilest animals in the scale of animated nature; and it cannot be doubted that his keeper generally shared in the contempt and abhorrence which he had excited. The prodigal son in the parable had spent his all in riotous living, and was ready to perish through want, before he submitted to the humiliating employment of feeding swine."

We pass over Paxton's description of the hog as the "vilest of animals," because there is no sense in the expression, and its presumed meaning is unworthy notice. It cannot, however, be doubted from the passage in *Luke* (xv. 15), and from others well known, that herds of swine were kept by the Jews, perhaps for sale and profit. Dr. J. Kitto says, "There does not appear to be any reason in the law of Moses why the hog should be held in such peculiar abomination. There seems nothing to have prevented the Jews, if they had been so inclined, to rear pigs for sale, or for the use of the *lard*. In the Talmud there are some indications that this was actually done; and it was probably for such purpose that the herds of swine mentioned in the New Testament were kept, although it is usual to consider that they were kept by the foreign settlers in the land. Indeed the story which accounts for the peculiar aversion of the Hebrews to the hog, assumes that it did not originate until about 130 years before Christ, and that previously some Jews were in the habit of rearing hogs for the purposes indicated."

The same writer, in a note upon *Luke* viii. 32, enters at greater length into this subject. "We have already," he says, "intimated our belief that there was much error in supposing that the law which declared that certain kinds of animals were not to be used for food, should be understood as prohibiting them from rearing, for any other purpose, the animals interdicted as food. There was certainly nothing in the law to prevent them from rearing hogs, more than from rearing asses, if they saw fit to do so. It appears, in fact, that the Jews did rear pigs for sale to their heathen neighbours, till this was forbidden after the principle of refining upon the law had been introduced. This prohibition demonstrates the previous existence of the practice, and it did not take effect till about 70 years B.C., when it is alleged to have originated in a circumstance which occurred between Hyrcanus and Aristobulus, the sons of King Alexander Jannæus. Aristobulus was besieging Hyrcanus in Jerusalem, but not wishing to interrupt the services of the temple, he permitted an arrangement under which money was let down from the temple in a box, in return for which the lambs required for the daily sacrifices were sent up. It at last occurred to a mischievous old man, 'who understood the wisdom of the

Greeks,' that there would be no overcoming the adverse party while they employed themselves in the service of God; and therefore one morning he put a hog in the box instead of a lamb. When half-way up, the pig reared himself up and happened to rest his fore feet upon the temple wall; whereupon, continues the story, Jerusalem and the land of Israel quaked. In consequence of this, two orders were issued by the Council,—‘Cursed be he that breedeth hogs,’ and ‘Cursed be he who teacheth his son the learning of the Greeks.’ Such is the origin of the order against rearing hogs, as related in the Babylonian Talmud. One of the enforcements of this prohibition is curious, as showing for what purposes besides sale hogs had been reared by the Jews. ‘It is forbidden to rear any hog, even though hogs should come to a man by inheritance, in order to obtain profit from its skin, or from its fat, for anointing or for light.’ From this it would seem that the Jews had been wont to make ointments with hog’s lard, and that they did not exclusively use oil for lights, but fat also; which was probably done according to a method we have often seen in the East, by introducing a wick into a lump of grease, which is set in a lamp, or in a round hollow vessel made for the purpose; the heat of the kindled wick, as in a candle, gradually melts as much of the fat as is required to feed the flame. The inconvenience of the deprivation of the useful lard of hogs for this and other purposes, seems to have given occasion to an explanation that the prohibition was not to be understood to imply that the fat of hogs might not be obtained by purchase from the Gentiles. The prohibition of keeping hogs does not appear to have had complete effect, as regulations are made concerning towns in which hogs were kept; and the keepers of swine are mentioned as contemptible and infamous wretches, so that it was a favourite term of abuse to call a person a hog-breeder, or a swineherd. Although therefore it may be likely that the herds of swine here mentioned were the property of the heathen who certainly did live with the Jews in the towns of this neighbourhood (the country of the Gadarenes), it is not impossible that they belonged to the Jews, who kept them in despite of the prohibitions we have mentioned.”

Among the ancient Egyptians, although the figure of the hog occurs several times well drawn at Edfou, this animal was held in detestation. Swine, says Herodotus, “are accounted such impure beasts by the Egyptians, that if a man touches one even by accident, he presently hastens to the river, and in all his clothes plunges himself into the water. For this reason, swineherds alone of the Egyptians are not suffered to enter any of their temples; neither will any man give his daughter in marriage to one of that profession, nor take a wife

born of such parents, so that they are necessitated to intermarry among themselves. The Egyptians are forbidden to sacrifice swine to any other deities than to Bacchus, and to the Moon, when completely at full, at which time they may eat of the flesh. When they offer this sacrifice to the Moon, and have killed the victim, they put the end of the tail, with the spleen and fat, into a caul found in the belly of the animal, all which they burn on the sacred fire, and eat the rest of the flesh, on the day of the full moon, though at any other time they would not taste it. Those who, on account of their poverty, cannot bear the expense of this sacrifice, mould a paste into the form of a hog, and make their offering. In the evening of the festival of Bacchus, though every one be obliged to kill a swine before the door of his house, yet he immediately restores the carcase to the swineherd who sold it.”

This aversion towards the hog, among the ancient Egyptians and the Jews (we need not here notice the Mohammedans or the Brahminical tribes of India), is very remarkable. Among the Greeks and Romans the flesh of the swine was held in estimation, although the swineherd attracted little notice from the poet. Why, then, in Western Asia and Egypt should it have been forbidden? We attribute it entirely to mystical or religious motives, which we are not quite able to appreciate. However it is but right to state, that other theories have been entertained. A recent writer (see *A Discourse upon National Dietetics, as connected with Dyspepsia, Hypochondriasis, Gout, &c., by George Warren, Surgeon*, 8vo. London, 1830) has in a most extraordinary manner denounced eating the flesh of the hog as the source of scrofula through the Christian world. He believes that the Latin name of the animal, *scrofa*, has been derived from the circumstance of the animal communicating, by being eaten, that scourge to the human race, namely scrofula, in all its moods and tenses; and he imagines that the Mosaic commandment was intended to apply to all people in every climate, and to remain in force for ever—that the act of infringing it invariably brings down upon the race of the offenders its corresponding curse. “Oh that mine enemy had written a book!” However, we shall not play the critic; suffice it to have noticed an opinion to which we cannot subscribe, inasmuch as we have yet to learn that nations holding the hog in abhorrence are exempt from scrofulous diseases—in short, that these maladies are and ever have been unknown among the Jews.

The following passage from Griffith’s Cuvier is more worthy our consideration, although it does not bring conviction to our mind; it is rather plausible than demonstrative. “In hot climates the flesh of swine is not good. M. Sonnini

remarks that in Egypt, Syria, and even the southern parts of Greece, this meat, though very white and delicate, is so far from being firm, and is so overcharged with fat, that it disagrees with the strongest stomachs. It is therefore considered unwholesome, and this will account for its proscription by the legislators and priests of the East. Such an abstinence was doubtless indispensable to health, under the burning suns of Egypt and Arabia. The Egyptians were permitted to eat pork only once a-year, on the feast day of the Moon, and then they sacrificed a number of these animals to that planet. At other times, if any one even touched a hog, he was obliged immediately to plunge into the river Nile with his clothes on by way of purification. The swineherds formed an isolated class, the outcasts of society. They were interdicted from entering the temples, or intermarrying with any other families. This aversion for swine has been transmitted to the modern Egyptians. The Copts rear no pigs, any more than do the followers of Mohammed. The Jews, who borrowed from the Egyptians their horror of pigs, as well as many other peculiarities, continue their abstinence from them in colder climates, where they form one of the most useful articles of subsistence."

If the hog in warm climates is so unwholesome as food, how happens it that the Chinese rear this animal in such numbers for the table; and how happens it that the hare (if indeed this animal be intended) was forbidden by the Mosaic laws as food? Surely the same objections could not apply to this latter animal as to the hog. Whatever the motives might have been, both among the Egyptians and the Jews, which led them to forbid the use of swine's flesh on the table, a regard to the health of the people was not one. Locusts were permitted by the latter, but creeping things in general denied, as were also fishes destitute of apparent scales. Among the ancient Greeks and Romans the flesh of the pig was held in great estimation; the art of rearing, breeding, or fattening these animals was made a complete study, and the dishes prepared from the meat were dressed with Epicurean refinement and in many modes. One dish consisted of a young pig whole, stuffed with beccaficoes and other small birds, together with oysters, and served in wine and rich gravy. This dish was termed *Porcus Trojanus*, in allusion to the wooden horse filled with men which the Trojans introduced into their city—an unpleasant allusion, one would think, seeing that the Romans boasted their Trojan descent; however, such was the name of this celebrated and most expensive dish, so costly indeed that sumptuary regulations were passed respecting it.

Esteemed, however, as the flesh of the hog was by the Greeks and Romans, commonly as the animal was kept, and carefully and even curiously

as it was fed, in order to gratify the appetites of the wealthy and luxurious, yet the swineherd, as may be inferred from the silence of the classic writers, and especially of the poets who painted rural life, was not held in much estimation. No gods or heroes are described as keeping swine, Theocritus never introduces the swineherd into his idyls, nor does Virgil admit him into his eclogues, among his tuneful shepherds. Homer indeed honours Eumæus, the swineherd of Ulysses, with many commendations; but he is a remarkable exception. Perhaps a general feeling prevailed, and still in some measure prevails, that the feeders of the gluttonous and wallowing swine become assimilated in habits and manners to the animals under their charge; or it may be that the prejudices of the Egyptians relative to this useful class of men extended to Greece or Italy, giving a bias to popular opinion.

From the earliest times in our own island the hog has been regarded as a very important animal, and vast herds were tended by swineherds, who watched over their safety in the woods, and collected them under shelter at night. Its flesh was the staple article of consumption in every household, and much of the wealth of the rich and free portion of the community consisted in these animals. Hence bequests of swine, with land for their support, were often made; rights and privileges connected with their feeding, and the extent of woodland to be occupied by a given number, were granted according to established rules. In an ancient Saxon grant quoted by Sharon Turner in his *History of the Anglo-Saxons*, we find the right of pasturage for swine conveyed by deed. "I give food for seventy swine in that woody allotment which the countrymen call Wolferdinlegh." The locality of the swine's pasturage, as here described, has a somewhat ominous title, referring as it does to the haunt of an animal, from incursions of which on flocks of sheep and herds of swine, during the Saxon period of our history, both the shepherd and the swineherd had to preserve their respective charges. The men employed in the duties, generally thralls or born slaves of the soil, were assisted by powerful dogs capable of contending with a wolf, at least until the swineherd came with his heavy quarter-staff or spear to the rescue. In Sir Walter Scott's novel of *Ivanhoe*, the character of Gurth is a true but of course somewhat over-coloured picture of an Anglo-Saxon swineherd, as is that of his master of a large landed proprietor, a great portion of whose property consisted in swine, and whose rude but hospitable board was liberally supplied with the flesh.

Sharon Turner, speaking of the food of the Anglo-Saxons, says, "For their animal food they had oxen, sheep, and great abundance of swine;

they used likewise, fowls, deer, goats, and hares; but though the horned cattle are not unfrequently mentioned in their grants and wills, and were often the subjects of exchange, yet the animals most numerous stated are the swine. The country in all parts abounded with wood; and woods are not often particularized without some notice of the swine which they contained, or were capable of maintaining. They also appear frequently in wills. Thus Alfred, a nobleman, gives to his relations a hide of land, with one hundred swine; and he directs one hundred swine to be given to one minister, and the same number to another; and to his two daughters he gives two thousand swine. (*Will in App. Sax. Dict.*) So Elfhelm gives land to St. Peter's at Westminster, on the express condition that they feed two hundred of these animals for his wife. They used eels as abundantly as swine. Two grants are mentioned, each yielding one thousand eels, and by another two thousand eels were reserved as an annual rent. Four thousand eels were a yearly present from the monks of Ramsey to those of Peterborough. From this it would appear that marshes and dikes were, comparatively speaking, equivalent to the swine-breeding forests of the Anglo-Saxons. For farther information see *History of Anglo-Saxons*, vol. iii. chap. 3.

Long after the close of the Saxon dynasty, the practice of feeding swine upon the mast and acorns of the forest was continued, till our forests were cut down and the land laid open for the plough; even yet in some districts, as the New Forest of Hampshire, the custom is not discontinued, and in various parts of the country, where branching oaks in the hedgerow overshadow the rural and secluded lanes, the cottagers turn out their pig or pigs, under the care of some boy, to pick up the fallen acorns in autumn. Pigs turned out upon stubble fields after harvest, often find in oak copses, in October and November, a welcome addition to their fare. Bloomfield, who copied from simple nature, has well and graphically described the eagerness of the hog for his acorn fare:—

"No more the fields with scattered grain supply
The restless wandering tenants of the sty;
From oak to oak they run with eager haste,
And wrangling share the first delicious taste
Of fallen acorns, yet but thinly found,
Till the strong gale has shook them to the ground.
It comes, and roaring woods obedient waive,
Their home well pleased the joint adventurers leave;
The trudging sow leads forth her numerous young,
Playful, and white, and clean, the briars among,
Till briars and thorns increasing fence them round,
Where last year's mouldering leaves bestrew the ground,
And o'er their heads, loud lashed by furious squalls,
Bright from their cups the rattling treasure falls.
Hot thirsty food, whence doubly sweet and cool
The welcome margin of some rush-grown pool,
The wild duck's lonely haunt, whose jealous eye
Guards every point; who sits prepared to fly."

The large forests of England were formerly

royal property, nevertheless the inhabitants of the adjacent towns, villages, and farms enjoyed both before and long after the Conquest, under certain conditions of a feudal nature, and probably varying according to circumstances, and the tenures by which lands were held, the right of fattening their swine in these woodlands. The lawful period for depasturing swine in the royal forests extended from fifteen days before Michaelmas to forty days afterwards, and this was termed the pannage month. This term was not, however, very strictly adhered to; many herds were suffered to remain in the forest during the whole year, the consequence of which was that numbers became feral, and were not collected by their owners without difficulty. Little damage would be done in the woods by these swine, but, no doubt, like their wild progenitors, they would take every opportunity of invading the cultivated grounds, and of rioting in the fields of green or ripening corn.

Dr. Hibbert, in *Transactions of the Antiquarian Society of Scotland* (vol. iii.), gives, in a paper entitled 'Illustrations of the Customs of a Manor in the North of England,' some particulars relative to the tenures on which swine were fed in the woods, and the numbers allowed to be kept, derived from an ancient court-roll of the manor of Ashton-under-Lyne, in Lancashire, and dated A.D. 1422. "Attached," he writes, "to these ordinances was a covenant between Sir John of Assheton and his tenants relative to the keeping of swine. These animals were allowed to range in the demesnes of the town from the latter end of August until sowing time, provided they were properly ringed and did no harm, in default whereof, the owner was to loose him to the lord for fourpence (that is pay a fine), or by this sum redeem the animal from poundage." It farther appears that the public brewer and the miller were allowed to keep three swine, the tenants of land in the fields two swine, and he who held no land might keep one. The lord of Ashton manor had, it appears, by his tenure from the crown, to pay a tribute of swine to the king. In a chapter on the 'King's Entertainment from the Manors,' it is stated that among various rents which vassal manors must grant the king, is a three-year-old swine in winter; while among the articles which form the king's entertainment from a free manor in winter, are enumerated a three-year-old swine and a fitch of bacon salted, being three fingers in thickness.

In the year 1422, Henry V. died, and Henry VI. ascended the throne. At that time the forests and woodland wilds of England were very extensive, and continued so with little alteration for several centuries; for, in 1646, Norwood, in Surrey (a place well known to the inhabitants of London), is described as extending over 830 acres, from

which the inhabitants of Croydon have herbage for all kinds of cattle, and mastage for swine without stint.

It was not only in the Anglo-Saxon portion of our island, but also in that part occupied by the ancient British, called Wales, that numbers of swine were reared. In the laws of Hoel Dha (A.D. 960) the price of a young pig, from its birth to the time of its weaning, is ordained at one penny; when it ceases sucking, at the end of three months, it is valued at two-pence; from the time that it goes into the wood with the swine, being then considered as a swine, its value is four-pence; from the feast of St. John unto the first day of January, its value is fifteen-pence; from the first day of January unto the feast of St. John, its value is twenty-four pence; and from that time forward its value shall be thirty-pence, the same as its mother. The qualities of a sow are that she breeds pigs, and does not devour her young ones. The seller must also warrant her sound against the quinsy for three days and nights after she is sold. If she should not possess these qualities, one-third of her price must be returned. The value of a boar is equal to that of three sows. Other regulations follow, relative to compensation for the damage done by swine, either by trespassing on corn lands, or by entering cottages, scattering the fire, and setting the cabin in flames, in which latter affair we find the value of the pig and the cottage to be of the same estimated ratio.

As we have already intimated, the practice of feeding swine in our forests, and the right so to do under certain restrictions as to time and some small payment, is still in operation, and especially in the New Forest, Hampshire. The following extract from Gilpin's *Forest Scenery*, delineates the method in which the swineherd manages his charge, and is so graphically delineated that we may be well pardoned for transcribing it; the scene, however, is of modern date. The wolf-haunted forests of Inglewood, Martindale, Teesdale, Pickering, Delamere, Sherwood, Needwood, Charnwood, Arnwood, and many more, have become *disforested*, and their old inmates have disappeared:—

"No! those days are gone away,
And their hours are old and grey,
And their minutes buried all
Under the down-trodden fall
Of the leaves of many years."

KEATS.

Yet all trace of our forests has not departed, and a picture of the swineherd's life in the New Forest may embody forth a Gurth of modern days, but happily no longer a serf. Gilpin, then, in his *Remarks on Forest Scenery*, vol. ii., thus describes the mode of feeding swine in the Boldre-wood, New Forest:—"These woods (of the New Forest)

afford excellent feeding for hogs, which are led in the autumn season into many parts of the forest, but especially among the oaks and beeches of Boldre-wood, to fatten on mast. It is among the rights of the forest borderers to feed their hogs in the forest during the *pawning month*, as it is termed, which commences about the end of September, and lasts six weeks. For this privilege they pay a trifling acknowledgment at the steward's court at Lyndhurst. The word *pawnage* was the old term for the money thus collected.

"The method of treating hogs at this season of migration, and of reducing a large herd of those unmanageable brutes to perfect obedience and good government, is curious.

"The first step the swineherd takes is to investigate some close-sheltered part of the forest, where there is a convenience of water, and plenty of oak or beech-mast, the former of which he prefers when he can have it in abundance.* He fixes next on some spreading tree, round the bowl of which he wattles a slight circular fence of the dimensions he wants, and covering it roughly with boughs and sods, he fills it plentifully with straw or fern.

"Having made this preparation, he collects his colony among the farmers, with whom he commonly agrees for a shilling a-head, and will get together perhaps a herd of five or six hundred hogs. Having driven them to their destined habitation, he gives them a plentiful supper of acorns or beech-mast, which he had already provided, sounding his horn during the repast. He then turns them into the litter, where, after a long journey and a hearty meal, they sleep deliciously.

"The next morning he lets them look a little around them, shows them the pool or stream where they may occasionally drink, leaves them to pick the offal of the last night's meal, and, as evening draws on, gives them another plentiful repast, scattering acorns among them for an hour together, to the sound of his horn. He sends them again to sleep.

"The following day he is perhaps at the pains of procuring them another meal, with music playing as usual. He then leaves them a little more to themselves, having an eye, however, to their evening hours. But as their bellies are full, they seldom wander far from home, retiring commonly very early to bed.

"After this he throws his sty open, and leaves them to cater for themselves, and from henceforward has little more trouble with them during the whole time of their migration. Now

* Pliny seems to be of a different opinion—"Glans fagea suem hilarem facit, carnem coquibilem ac levem, et utilem stomacho. Tradit Nigidius fungosam carnem fieri esculo, robore, subere."—Liber xvi., 6.

and then, in calm weather, when acorns fall sparingly, he calls them perhaps together, by the music of his horn, to a gratuitous meal, but in general they need little attention, returning regularly home at night, though they often wander in the day two or three miles from their sty. There are experienced leaders in all herds, which have spent this roving life before, and can instruct their juniors in the method of it. By this management the herd is carried home to their respective owners in such condition that a little dry meal will soon fatten them.

"I would not, however, have it supposed that all the swineherds in the forest manage their colonies with this exactness. Bad governments and bad governors will everywhere exist; but I mention this as an example of sound policy—not a mere Platonic or Utopian scheme, but such as has often been realized, and has as often been found productive of good order and public utility. The hog is commonly supposed to be an obstinate, headstrong, unmanageable brute. He may, perhaps, have a degree of positiveness in his temper; in general, however, if he be properly managed, he is an orderly docile animal. The only difficulty is to make your meanings, when they are fair and friendly, intelligible to him. Effect this, and you may lead him with a straw.

"Nor is he without his social feelings, when he is at liberty to indulge them. In these forest migrations it is commonly observed that of whatever number the herd consists, they generally separate, in their daily excursions, into such little knots and societies as have formerly had habits of intimacy together, and in these friendly groups they range the forest, returning home at night in different parties, some earlier and some later, as they have been more or less fortunate in the pursuits of the day. It sounds oddly to affirm the life of a hog to be enviable, and yet there is something uncommonly pleasing in the lives of these emigrants—something at least more desirable than is to be found in a hog *Epicuri de grege*. They seem themselves also to enjoy their mode of life. The hog has a greater variety of language than perhaps any other quadruped. He signifies his want of food with great energy; when affronted, his note is very significant; and his cries of distress are truly lamentable. But here you see him perfectly happy, going about at his ease, and conversing with his friends in short, pithy, interrupted sentences, which are no doubt expressive of his enjoyments and of his social feelings.

"Besides the hogs thus led out in the mast season to fatten, there are others, the property of forest-keepers, which spend the whole year in such societies. After the mast season is over the indigenous forest-hog depends chiefly for his livelihood on the roots of fern, and he would find

this food very nourishing if he could have it in abundance. But he is obliged to procure it by so laborious an operation that his meals are rarely accompanied with satiety. He continues, however, by great industry to obtain a tolerable subsistence through the winter, except in frosty weather, when the ground resists his delving snout; he must then perish if he do not in some degree experience his master's care. As spring advances, fresh grasses and salads of different kinds add a variety to his bill of fare, and as summer comes on he finds juicy berries and grateful seeds, on which he lives plentifully till autumn returns and brings with it the extreme of abundance.

"Besides these stationary hogs, there are others in some of the more desolate parts of the forest which are bred wild and left to themselves without any settled habitation, and as their owners are at no expense either in feeding or attending them, they are content with the precarious profit of such as they are able to reclaim."

In France, Spain, Portugal, and Italy, swine are fed in a similar manner in the forests. In France the right of depasturing swine in the woods (*la glandage*) was formerly a source of considerable profit to the foresters, and is so still in some districts where tracts of woodland afford the necessary supply of mast and acorns.

In Germany the pigs of the villages are driven every morning, under the surveillance of a swineherd, to the adjacent hills, brought back to their respective homes to dinner, driven out again in the afternoon, and again brought back in the evening. It is but little they can obtain on the hills by way of food, nor can we see why this system of daily migrations should be persisted in throughout all the months of the year. But so it is, and an amusing picture is given of the mode in which the affair is conducted by the writer of a work entitled *Bubbles from the Brunns of Nassau*. The writer is sojourning at Langenschwalbach in the Duchy of Nassau. "Every morning," he says, "at half past five o'clock I hear, as I am dressing, the sudden blast of an immense long wooden horn, from which always proceed the same four notes. I have got quite accustomed to this wild réveille; and the vibration has scarcely subsided and is still ringing among the distant hills, when leisurely proceeding from almost every door in the street, behold a pig! Some, from their jaded, careworn, dragged appearance, are evidently leaving behind a numerous litter; others are great, tall, monastic, melancholy creatures, which seem to have no other object left in this wretched world than to become bacon; while others are thin, tiny, light-hearted, brisk, petulant piglings, with the world and all its loves and sorrows before them. Of their own accord these creatures proceed down the street to join

the herdsman, who occasionally continues to repeat the sorrowful blast from his horn.

"Gregarious, or naturally fond of society, with one curl in their tails and with their noses almost touching the ground, the pigs trot on, grunting to themselves and to their comrades, halting only whenever they come to anything they can manage to swallow.

"I have observed that the old ones pass all the carcasses which, trailing to the ground, are hanging before the butchers' shops, as if they were on a sort of *parole d'honneur* not to touch them; the middle-aged ones wistfully eye this meat, yet jog on also; while the piglings, who (so like mankind) have more appetite than judgment, can rarely resist taking a nibble; yet, no sooner does the dead calf begin to move, than from the window immediately above out pops the head of a butcher, who, drinking his coffee whip in hand, inflicts a prompt punishment, sounding quite equal to the offence.

"As I have stated, the pigs generally speaking proceed of their own accord, but shortly after they have passed there comes down our street a little bare-headed, bare-footed, stunted dab of a child, about eleven years old; a Flibbertigibbet sort of a creature, which in a drawing one would express by a couple of blots, the small one for her head, the other for her body; while, streaming from the latter, there would be a long line ending in a flourish, to express the immense whip which the child carries in its hand. This little goblin page, the whipper-in, attendant, or aide-de-camp of the old pig-driver, facetiously called at Langenschwalbach the Schwein-general, is a being no one looks at, and who looks at nobody. Whether the Hofs of Schwalbach are full of strangers, or empty; whether the promenades are occupied by princes or peasants; whether the morning be good or bad, hot or rainy, she apparently never stops to consider—upon such vague subjects it is evident she never for a moment has reflected. But such a pair of eyes for a pig have perhaps seldom beamed from human sockets! The little intelligent urchin knows every house from which a pig ought to have proceeded; she can tell by the door being open or shut, and even by footmarks, whether the creature has joined the herd, or whether, having overslept itself, it is still snoring in its sty; a single glance suffices to inform her whether she shall pass a yard or enter it; and if a pig, from idleness or greediness, be loitering on the road, the sting of the wasp cannot be sharper or more spiteful than she gives it. As soon as, finishing with one street, she joins her general in the main road, the herd slowly proceed down the town.

"As I followed them this morning they really appeared to have no hams at all—their bodies were as flat as if they had been squeezed in a

vise; and when they turned sideways, their long sharp noses and tucked-up bellies gave to their profile the appearance of starved greyhounds. . . .

"Besides the little girl who brought up the rear, the herd was preceded by a boy of about fourteen, whose duty it was not to let the foremost, the most enterprising, or, in other words, the most empty pig, advance too fast. In the middle of the drove, surrounded like a shepherd by his flock, slowly stalked the Schwein-general, a wan spectre looking old man, worn out, or nearly so, by the arduous and every-day duty of conducting against their wills a gang of exactly the most obstinate animals in creation. A single glance at his jaundiced ill-natured countenance was sufficient to satisfy one that his temper had been soured by the vexatious contrarieties and untoward events it had met with. In his left hand he held a staff to help himself onwards, while round his shoulder hung one of the most terrific whips that could possibly be constructed. At the end of a short handle, turning upon a swivel, there was a lash about nine feet long, formed like the vertebræ of a snake, each joint being an iron ring, which, decreasing in size, was closely connected with its neighbour by a band of hard greasy leather. The pliability, the weight, and the force of this iron whip, rendered it an argument which the obstinacy even of the pig was unable to resist; yet as the old man proceeded down the town he endeavoured to speak kindly to the herd; and as the bulk of them preceded him, grumbling and grunting on their way, he occasionally exclaimed in a low, hollow, worn-out tone of encouragement, 'Nina! Anina!' drawing, of course, very long on the last syllable. If any little savoury morsel caused a contention or stoppage on the march, the old fellow slowly unwound his dreadful whip, and by merely whirling it round his head, like reading the riot-act, he generally succeeded in dispersing the crowd; but if they neglected this solemn warning—if their stomachs proved stronger than their judgments, and if the group of greedy pigs still continued to stagnate—'arriif!' the old fellow exclaimed, and rushing forwards, the lash whirling round his head, he inflicted, with a strength which no one could have fancied he possessed, a smack that seemed absolutely to electrify the leader. As lightning shoots across the heavens, I observed the culprit fly forwards; and for many yards continuing to sidle to the left, it was quite evident that the thorn was still smarting in his side; and no wonder, poor fellow! for the blow he received would almost have cut a piece out of a door.

"As soon as the herd got out of the town, they began gradually to ascend the rocky barren mountain which appeared towering above them; and then the labours of the Schwein-general and his staff became greater than ever; for as the

animals from their solid column began to extend or deploy themselves into line, it was necessary constantly to ascend and descend the slippery hill in order to outflank them. 'Arriff!' vociferated the old man, striding after one of his rebellious subjects—'arriff!' in a shrill tone of voice, was re-echoed by the lad, as he ran after another. However, in due time the drove reached the ground which was devoted for that day's exercise, being thus taken in regular succession.

"The Schwein-general now halted; and the pigs being no longer called upon to advance, but being left entirely to their own notions, I became exceedingly anxious attentively to observe them.

"No wonder, poor reflecting creatures! that they had come unwillingly to such a spot, for there appeared literally to be nothing for them to eat but hot stones and dust; however, making the best of the bargain, they all very vigorously set themselves to work. Looking up the hill, they dexterously began to lift up with their snouts the largest of the loose stones, continually grubbing their noses into the cool ground. Their tough wet snouts seemed to be sensible of the quality of everything they touched; and thus out of the apparently barren ground they managed to get fibres of roots, to say nothing of worms, beetles, and other travelling insects they met with. As they slowly advanced, working up the hill, with their ears most philosophically shading their eyes from the hot sun, I could not help feeling how little we appreciate the delicacy of several of their senses, and the extreme acuteness of their instinct.

"There exists perhaps in creation no animal which has less justice and more injustice done to him by man than the pig. We see him gifted with every faculty of supplying himself, and of providing even against the approaching storm, which no creature is better capable of foretelling, and we begin our treatment of him by putting an iron ring through the cartilage of his nose; having thus barbarously deprived him of the power of searching for and analyzing his food, we then generally condemn him for the rest of his life to solitary confinement in a sty.

"While his faculties are still his own, only observe how with a bark or snort he starts if you approach him; and mark what shrewd intelligence there is in his bright twinkling little eye;—but with pigs, as with mankind, idleness is the root of all evil. The poor animal, finding that he has absolutely nothing to do—having no enjoyment, nothing to look forward to, but the pail which feeds him—most eagerly, or, as we accuse him, most greedily he greets its arrival. Having no business or diversion—nothing to occupy his brain—the whole powers of his system are directed to the digestion of a superabundance of

food. To encourage this, nature assists him with sleep, which, lulling his better faculties, leads his stomach to become the ruling power of his system—a tyrant that can bear no one's presence but his own. The poor pig thus treated, gorges himself, sleeps—eats again—sleeps—awakens in a fright—screams—struggles against the blue apron—screams fainter and fainter—turns up the whites of his little eyes—and dies!"

We quite agree with the writer quoted, that the sense and intelligence of the pig are greatly under-rated; but should we like to see such ill-favoured gaunt beasts as the pigs of Germany, and, as we can personally testify, of many parts of France? A clean, fat, good-looking pig, in a well-strawed sty or litter-yard, nestling among the straw, such as those drawn by Morland, is a much happier animal than the over-driven, over-beaten, over-starved wretch which a German swineherd drives to the mountains for no purpose, or at least for that only of ploughing up the earth with its snout, and thereby wasting time which might be more profitably and pleasantly employed by the animal in such enjoyments as its porcine nature is capable of appreciating; and of these its meals, sufficient and regular, are not among the least. A farm-yard in Essex, Hampshire, or Berkshire will present a far more attractive and really interesting sight than Langen-Schwalbach with its diurno-migratory herds of half starved swine can afford, as far as these animals are concerned. With what ineffable disgust would they be regarded by an English farmer!

However, we have not quite done with our author, some of whose subsequent passages may be omitted without any regret. It is not to his fancy, but to his details that we wish to attend.

"But to return to the Schwein-general, whom, with his horn and whip, I have left on the steep side of a barren mountain.

"In this situation do the pigs remain every morning for four hours, enjoying little else than air and exercise. At about nine or ten o'clock they begin their march homewards, and nothing can form a greater contrast than their entry into their native town does to their exit from it.

"Their eager anxiety to get to the dinner-trough that awaits them is almost ungovernable; and they no sooner reach the first houses of the town, than a sort of *saute qui peut* motion takes place. Away each then starts towards his home, and it is really very curious to stand still and watch how very quickly they canter by, greedily grunting and snuffling, as if they could smell with their stomachs as well as their noses the savoury food which was awaiting them. (Query the *savoury* food?)

"At half-past four the same four notes of the same horn are heard again, the pigs once more

assemble, once more tumble over the hot stones on the mountain, and in the evening once again return to their sties.

"Such is the life of the pigs not only of Langen-Schwalbach, but of those of every village throughout a great part of Germany. Every day of their existence, summer and winter, is spent in the way I have described. The squad consists here of about a hundred and fifty, and for each pig the poor old Schwein-general receives forty kreuzers (13*d.*) for six months' drilling of each recruit. This income, therefore, is about £20 a-year, out of which he has to pay the board,

lodging, and clothing of his two aides-de-camp; and when one considers how unremittingly this poor fellow-creature has to contend with the gross appetites, sulky tempers, and pig-headed dispositions of the swinish multitude, surely not even the most niggardly reformer would wish to curtail his emoluments."

It would be well, we think, if the Schwein-general's office were altogether abolished, and the half-starved brutes put upon better diet. Perhaps, however, it is from this mode of treatment that the bristles of their neck and ridge of the back become long, strong, and wiry.

CHAPTER III.

ON THE CHARACTER AND GENERAL UTILITY OF THE HOG AS A DOMESTIC ANIMAL, AND ON ITS WIDE EXTENT OF DISTRIBUTION.

It has been usual to condemn the domestic hog, in no very measured terms, as a filthy, stupid brute, at once gluttonous, obstinate, and destitute of intelligence. Against this sweeping censure we beg to enter our protest. With regard to the filthiness of the hog in a state of confinement, everything will depend on the trouble taken by its keeper. He may allow the sty or the yard to be covered with filth of every description, as disgraceful to himself as it is injurious to the animals. In this case the hog is the sufferer; for naturally it delights in clean straw, luxuriating in it with evident pleasure, its twinkling little eyes and low grunt expressing its feelings of contentment. In fact, the hog, so far from being the filthiest, is one of the cleanliest of our domestic quadrupeds, and is unwilling to soil the straw bed of his domicile if anything like liberty be allowed him. It may be here said, is not the hog fond of wallowing in the mire? Undoubtedly it is; and so are all the genuine *pachydermata*, as the elephant, the rhinoceros, and the tapir. The skin of these animals, thick as it may be, is nevertheless sensitive, and a covering of mud is doubtless intended as a protection to the skin in the heat of summer (the time in which the hog chiefly delights to wallow), both against the scorching rays of the sun and the attacks of myriads of puny but intolerable winged persecutors. No animal delights more to have its hide rubbed and scratched than the hog—a circumstance which every one practically conversant with pigs must have very frequently noticed. Passing one hot day through a pretty village in Derbyshire, we saw at the door of several cottages a fat pig, exquisitely clean, reposing on a bed of straw, and we saw, moreover, the cottager's wife in several instances

scrubbing the animals with a whisp of straw, or a brush, dipt repeatedly into a pail of a water—an operation which the creatures evidently enjoyed; at least they resisted not, as they would have done had it not been to their liking. Finer pigs never better rewarded the good management of their owners. No doubt the use of the whisp or scrubbing-brush contributed to their health and comfort. The cottagers affirmed that it made them fatten more kindly. Now, with respect to the gluttony of the pig, we acknowledge him to be "a huge feeder;" but so is the horse or the ox, and indeed every animal that has to support a bulky carcase; and not only so, but become fat upon vegetable aliment. To a certain extent, indeed, the hog is omnivorous, and may be reared on the refuse of the butcher's slaughter-house; but such food is not wholesome, nor is it natural; for though this animal be omnivorous, it is not essentially carnivorous. Vegetable productions, as roots and grain, beech-mast and acorns, constitute the staple of its natural diet; hence the refuse of the dairy farm is more congenial to the health of the animal, to say nothing of the quality of its flesh. All animals eat with a keen relish—the hog amongst the rest; besides, his appetite is pampered, the object being to make him fat: and certainly a well-fed plump hog is a more comely-looking beast than the gaunt, lean, flat-sided animals so generally seen in France and Germany. However, if the charge of gluttony be proved against the pig fattening in his sty, it may be equally proved against the ox fattening in his stall. When old, or when oppressed by fat, the hog, it must be confessed, is sluggish and indolent; when young, however, it is lively and energetic, and disposed to indulge in sportive gambols, which,

for anything we can see, are quite as amusing as those of lambs.

It is not often that the docility of the hog is tested, it is not generally speaking trained to labour; yet, according to Pennant, in Minorca, and also in that part of Moray which lies between the Spey and Elgin, it has been converted into a beast of draught. "I have been assured," he adds, "by a minister of that country (Moray), eye-witness to the fact, that he had seen, on his first coming into his parish, a cow, a sow, and two trogues (young horses), yoked together, and drawing a plough in a light sandy soil; and that the sow was the best drawer of the four. In Minorca the ass and the hog are common helpmates, and are yoked together in order to turn up the land."

In some parts of Italy the pig is trained to hunt for truffles; its sense of smell, as we well know, is exquisite. A string is tied to the animal's leg and it is led into the fields where this underground vegetable is produced; wherever the pig stops, smells the soil, and commences the operation of rooting it up, there the truffle is certain to be found.

The following details are narrated by Mr. Youatt:—"Some thirty years since it was mentioned in the public papers that a gentleman had trained swine to run in his carriage, and drove four in hand through London with these curious steeds. And not long since the market-place of St. Albans was completely crowded in consequence of an eccentric old farmer, who resided a few miles off, having entered it in a small chaise-cart drawn by four hogs at a brisk trot, which pace they kept up a few times round the area of the market-place. They were then driven to the Woolpack yard, and, after being unharnessed, were regaled with a trough of beans and wash. A gentleman present offered £50 for the whole concern as it stood, but his offer was indignantly declined. In about two hours the animals were re-harnessed, and the old farmer drove off with his extraordinary team."

Mr. Henderson gives an account of the manner in which himself and his brother, when boys, trained pigs for the saddle, and not only so, but for running matches; we do not think this to be a matter of much difficulty, for we have ourselves often seen pigs so docile as to allow themselves to be mounted by children to whom they were accustomed, and that without manifesting any unruliness or impatience. The fact is that the pig is not only very intelligent, but docile also, at least if properly managed; witness the number of *learned* pigs which have astonished the public from time to time by their performances, in arranging letters so as to form words, and by other tricks indicative of the animal's teachableness. The most extraordinary instance, however, of the docility of the pig, and one which proves that it

might become valuable for other qualities, were it duly educated, than those connected with its flesh, is narrated by Daniel in his *Rural Sports*; the story is fully substantiated. It is an account of a New Forest sow which was broke in like a pointer to stand at game, and which, from the delicacy of her scent, she would find when the dogs had been unsuccessful. The narrative is given as follows:—"Toomer (formerly one of the King's keepers in the New Forest, and afterwards gamekeeper to Sir Henry Mildmay) actually broke a black sow to find game, and to back and stand. *Slut* was bred in, and was one of that sort which maintain themselves in the New Forest without regular feeding, except when they have young, and then but for a few weeks. She was given when about three months old to be a breeding sow, by Mr. Thomas to Mr. Richard Toomer, both at that time keepers in the forest. From having no young she was not fed or taken much notice of, and, until about eighteen months old, was seldom observed near the lodge, but chanced to be seen one day when Mr. Edward Toomer was there. The brothers were concerned together in breaking pointers and setters, some of their own breeding, and others sent to be broke by different gentlemen; of the latter, though they would stand and back, many were so indifferent that they would neither hunt, nor express any satisfaction when birds were killed and put before them. The slackness of these dogs first suggested the idea that by the same method any other animal might be made to stand, and do as well as any of those huntless inactive pointers. At this instant the sow passed by, and was remarked as being very handsome. Richard Toomer threw her a piece or two of oatmeal roll, for which she appeared grateful, and approached very near; from that time they were determined to make a sporting pig of her. The first step was to give her a name, and that of *Slut* (given in consequence of soiling herself in a bog) she acknowledged in the course of the day, and never afterwards forgot. Within a fortnight she would find and point partridges or rabbits, and her training was much forwarded by the abundance of both which were near the lodge. She daily improved, and in a few weeks would retrieve birds that had run as well as the best pointer; nay, her nose was superior to that of the best pointer they ever possessed, and no two men in England had better. She hunted principally on the moors and heaths. *Slut* has stood to partridges, black-game, pheasants, snipes, and rabbits, in the same day, but was never known to point a hare. She was seldom taken by choice more than a mile or two from the lodge, but has frequently joined them when out with their pointers, and continued with them several hours. She has sometimes stood a jack-snipe when all the pointers had passed by it. She would back the dogs when they pointed, but

the dogs refused to back her until spoke to, their dogs being all trained to make a general halt when the word was given, whether any dog pointed or not, so that she has been frequently standing in the midst of a field of pointers. In consequence of the dogs not liking to hunt when she was with them (for they dropped their sterns and showed symptoms of jealousy), she did not very often accompany them, except for the novelty, or when she accidentally joined them in the forest. Her pace was mostly a trot, she was seldom known to gallop, except when called to go out shooting—she would then leave home for the forest at full-stretch; she was never shut up, but to prevent her being out of the sound of the call or whistle, when a party of gentlemen had appointed to see her out, and this call she obeyed as regularly as a dog, and was as much elevated as a dog upon being shown the gun. She always expressed great pleasure when game, either dead or alive, was placed before her; she has frequently stood a single partridge at forty yards' distance, her nose in an exact line, and would continue in that position until the game moved; if it took wing she would come up to the place and put her nose down two or three times, but if a bird ran off, she would get up and go to the place and draw slowly after it, and when the bird stopped she would stand it as before. The two Mr. Toomers lived about seven miles apart, at Rhinefield and Broomey Lodges; *Slut* has many a time gone out by herself from one lodge to the other, as if to court the being taken out shooting. She was about five years old when her master died, and at the auction of his pointers, &c. was bought in at ten guineas. Sir Henry Mildmay having expressed a wish to have her, she was sent to Dogmersfield Park, where she remained some years. She was last in the possession of Colonel Sykes, and was then ten years old, and had become fat and slothful, but could point game as well as ever. She was not often used, excepting to show her to strangers, as the pointers refused to act when out with her. When killed she weighed 700 lbs. Her death-warrant was signed in consequence of her having been accused of being instrumental to the disappearance of sundry missing lambs."

This is not the only instance on record of a pointer-pig. A sow in the possession of Colonel Thornton was broken in to hunt, quarter the ground, back the dogs, &c.

Here, then, we have most extraordinary examples of the docility and intelligence of the too much despised hog. Be it remembered, that it belongs to that group of which the sagacious elephant forms a portion—not that we assert the intellectual equality of the two animals; still, we believe that the hog may be trained to various modes of labour, with far less trouble than is

generally supposed. It is not, however, needed for any such purposes; consequently, except in a few isolated instances, its education is utterly neglected; all it has to do is to eat and sleep, and become fat—its utility to man commencing at its death by the knife of the butcher. Yet, even under the disadvantages in which the pig is placed—debarred its liberty, prevented from exercising its natural instincts, and undisciplined in the slightest degree—it manifests both discernment and attachment; it recognises the voice, and even the footsteps, of its feeder, and is evidently pleased with his notice. Instances of the attachment of pigs to particular persons, and even to other animals, are on record. It is not often, however, that porcine familiarity is encouraged. Setting all prejudice aside, it must be confessed that the animal would be more likely to prove troublesome and annoying, than agreeable or welcome. We have, however, heard of persons who have petted pigs, and know many who would abhor to partake of the flesh of one reared upon their own premises—a circumstance not to be wondered at, when we consider that, while alive, the animal not only knew them, but greeted their approach, and displayed unmistakeable signs of attachment.

The senses of smell, taste, and hearing are possessed by the hog in great perfection. It is a common saying that pigs can smell the coming storm; certain it is that they are very sensitive of approaching changes of weather. They become agitated, hurry under shelter, and during the continuance of the storm utter screams, run about with straw in their mouth, or carry it to their sty as if to add to their comfort and defence. This peculiarity has been noticed in ancient times, as well as in the present. Dr. Darwin, in his *Zoonomia*, says, "It is a sure sign of a cold wind when pigs collect straw in their mouths, and run about crying loudly. They would carry it to their beds for warmth, and by their calls invite their companions to do the same, and add to the warmth by numerous bed-fellows." At all times pigs are fond of huddling together under the straw, but especially in chilly or windy weather, from which the young in particular appear to suffer much. From this cause, litters of pigs farrowed during a severe winter are often greatly thinned, and the survivors thrive with difficulty.

From some ill-understood cause—probably from a strong morbid feeling, a sort of puerperal mania, excited perhaps by anxiety or some annoying circumstances acting upon an irritable nervous temperament—several domestic animals, as the rabbit, and sometimes the cat, seem to forget all instinctive ties, and turning upon their offspring ravenously and unnaturally devour them. This is not unfrequently the case with the sow; and it is remarkable, that when this revolting act has been once

committed, its re-occurrence may be expected: it would seem as if a perversion of the *στοργή* had taken place. This disposition is not always or necessarily connected with general ferocity, nor even with the fierce anxiety which the sow, with other animals, displays in the protection of her young; it may be that the animal is ordinarily mild and gentle, and yet at this juncture become madly ferocious. We are not aware whether or not such tragic scenes take place among animals in a state of natural independence; most probably it never does, or but very rarely. Yet in early ages the sow was evidently subject to this morbid propensity; for among the regulations respecting swine laid down by Hoel Dha, one of the good qualities of a sow expressly noticed, is that she do not devour her young ones. The less the sow, after bringing forth her young, is meddled with, the more comfortable her bedding, the more regularly and gently she has been previously managed and treated, the less likely is she to violate one of the great laws of nature.

The wild boar, as we have said, is a dangerous animal; and so indeed, to a certain extent, is the domestic boar of some of the larger breeds. Instances are not unfrequent of boars turning furiously upon their keepers, especially if interfered with when in company with the female, or if constrained to quit her society. On Saturday, November 24, 1837, a dealer in pigs, residing at Paradise Row, Maiden Lane, near Battle Bridge, London, was killed under the following circumstances:—He kept a huge boar, and about twelve o'clock that day was driving it along, no doubt contrary to its inclinations. When he arrived near the canal bridge, Maiden Lane, the beast turned on him, and attacked him with the utmost fury. It struck him down, and with its tusks ripped open the abdomen. Assistance arriving, the unfortunate man, still living, was placed in a cart for conveyance to St. Bartholomew's Hospital; but he died on the way. Instances of a nearly similar nature have come under our own knowledge; and one as fatal, in which the boar was most unwisely molested, was related to us to have occurred in a village in Gloucestershire. The infuriated animal half destroyed the palings of the enclosure, leapt over the ruins, with the rapidity of lightning pursued the intruder, and so dreadfully lacerated him, that he almost immediately expired; indeed, to so vehement a fury was the animal worked up, that he was shot for safety.

We have ourselves seen boars in so high a state of excitement, champing their jaws, with the foam dripping down, their eyes bloodshot, and the whole appearance so terror-striking, that none durst venture near them.

It is not, however, only at certain times and under certain circumstances that the boar is

dangerous; a boar, especially one of the large old breeds, is by no means a safe animal to venture near at any time, and we have more than once seen sows almost equally savage; this, however, is not generally the case.

None of the *pachydermata* are, as a general rule, remarkable for fertility. The elephant, the rhinoceros, the hippopotamus, &c. appear to produce only a single offspring at a birth, and that after a long period of gestation; for example, the gestation of the elephant is said to extend to twenty months and eighteen days. It is then not until after a considerable lapse of time that she again becomes pregnant, and she produces only a single young one. The hog-like peccaries produce, according to Azara, only two at a birth. To this rule the swine is an exception; it may be that the wild species are less prolific than the ordinary domestic variety of the genus *sus*, yet they are fertile, but in the ordinary hog this fertility is at a maximum. Cuvier says, "Sa fécondité surpasse beaucoup celle des autres animaux de sa taille, la truie produisant jusqu'à quatorze petits. Elle porte quatre mois, et deux fois par an. Le cochon grandit jusqu'à cinq ou six ans, peut produire des l'âge d'un an, et en peut vivre vingt." Ordinarily, a healthy sow produces eight, ten, or twelve young ones twice a-year. The period of gestation is somewhat variable; Cuvier says, "quatre mois;" others give it as three months, three weeks, and three days, that is 108 days. According to Mr. Tessier, out of fifteen sows one littered in 109 days, and one in 123 days, the latitude being fourteen days; according to others, the range of gestation extends from seventeen weeks or 119 days, to twenty weeks, or 140 days. According to Desmarest, the wild sow goes with young four months and a few days, and produces from three to nine at a birth, suckling them from three to four months. It would appear, then, from these observations that the period of gestation in the domestic sow varies according to age, constitution, food, and the peculiarities or idiosyncrasies of the peculiar breed. Young and weakly sows not only produce fewer pigs, but farrow earlier than those of more mature age and sounder constitution; and, moreover, as might be expected, their offspring are deficient in vigour, often indeed puny and feeble. Here, having trenchd upon the subject, we may advert to the principles upon which the breeding of swine should be conducted. Two great objects are in view, fertility and early fattening. With respect to fertility, we rather advocate moderation than excess, both on account of the strength and health of the mother, and the improvement of her progeny from a full supply of nutriment. How long a sow should be kept for breeding depends on circumstances; generally speaking, however, after three or four years the most fruitful sows, exhausted in

their reproductive energies, evince a great falling-off both in the number and vigour of their young. There are, however, exceptions, and of these one is recorded by Gilbert White, in Letter lxxv.

"The natural term of a hog's life," he says, "is little known, and the reason is plain—because it is neither profitable nor convenient to keep that turbulent animal to the full extent of its time; however, my neighbour, a man of substance, who had no occasion to study every little advantage to a nicety, kept a half-bred bantam sow, who was as thick as she was long, and whose belly swept the ground till she was advanced to her *twentieth year*, at which period she showed some symptoms of age by the decay of her teeth and the decline of her fertility.

"For about *ten years* this prolific mother produced *two litters* in the year, of about *ten* at a time, and once *above twenty* at a litter; but as there were nearly double the number of pigs to that of teats many died. From long experience in the world this female was grown very sagacious and artful. When she found occasion to converse with a boar, she used to open all the intervening gates, and march by herself up to a distant farm where one was kept, and when her purpose was served would return by the same means. At the age of about fifteen her litters began to be reduced to four or five; and such a litter she exhibited when in her fattening pen. She proved when fat good bacon, juicy and tender; the rind, or sward, was remarkably thin. At a moderate computation, she was allowed to have been the fruitful parent of 300 pigs—a prodigious instance of fecundity in so large a quadruped; she was killed in spring, 1775."

Generally speaking, it is most advantageous to allow the sow to breed only two or three years, and her successors being ready, to fatten her off for the knife. In some places it is the practice to spay the sow; that is, remove the ovaries, so as to render her unfertile before putting her up to fatten, but this is not a uniform practice. Her bacon is said to be better for this operation; and, doubtless, she fattens much more rapidly.

A leading principle in breeding this animal, and it applies equally to the horse, the sheep, the ox, and the dog, is, to make a cautious selection of the male by whom the female is destined to conceive her first progeny, for that male stamps a character upon every subsequent produce (whether for good or bad) by other males; "the subsequent progeny of the mother will always partake more or less of the character of the father of the first offspring." This law is mysterious, but it has been abundantly proved (See Giles, in *Philosophical Transactions* for 1821), and need not be here further insisted on; the fact is established. The selection of the male then is of primary importance;

of whatever breed he may be, he should be as perfect as possible in the good qualities of his race; he should be free from all blemishes, and be, moreover, the offspring of parents in all points unexceptionable. A young boar intended for breeding from, should be kept separate from the sows until about a year old, when his physical energies will be fairly developed. Form is of more importance than size; in this latter respect the breeds differ, as they do also in the size of the ears, which in some breeds are flapping, especially in those which incline to the old stock. Good pigs, it is true, may show such ears, but small sharp erect ears accompany what may be called *blood*. In a well-formed boar the barrel should be rather long and cylindrical, the limbs should be small in the bone, the hoofs neat and compact, the skin should be rather loose and mellow, with the bristles fine but scanty; the snout should be short and sharp, the forehead rise boldly between the ears, and merge into an arched neck; the back should be straight and broad; the hams rounded and ample, the chest should be wide, indicative of the amplitude and vigour of the vital organs. The tail should be slender, the eyes should be lively, the temper or disposition cheerful without moroseness. As to colour, some breeds are black, others are white, but we think that black pigs are thinner in the skin, and are moreover less subject to cutaneous affections.

The boar should never be admitted to the sow until he is fully one year old, and during the time he should be well fed, kept clean, and be allowed sufficient exercise, with the liberty of amusing himself unringed in a well-secured paddock or convenient enclosure. By this plan his bodily vigour will be increased, he will grow better, and the proportions of his frame will be brought out in due perfection and harmony. One boar may be allowed a seraglio of eight or ten sows, but no more; he should, however, on no account be admitted to several in the same enclosure or sty together, but to one only at a time, and to the others in rotation after a few days' interval. It is generally the practice to keep a boar for breeding from, for two years, and then to castrate him for the purpose of fattening for bacon. If kept as a boar beyond this period, the flesh becomes rank and uneatable, nevertheless it may be advisable, even at the expense of the flesh, to keep him as a boar for some years longer, if he be of first-rate qualities, and of a breed of peculiar excellence, and there be no worthy successor in the breeder's possession. It must not be forgot, however, that the practice of breeding in and in, particularly as it respects swine, is a great evil; the offspring become degenerate, the number produced at each litter decreases, the lurking bad qualities of ancestors, which under care and judicious crossings

had disappeared, will reappear, and the strain will become worthless.

Equal care should be taken in the selection of a breeding sow as of a boar; she should be of good stature and form, sound, healthy, and free from defects; she should have twelve teats at least; for, as may be observed, each little pig selects its own teat, and keeps to it, so that a pig not having one belonging to it would in all probability be starved. A sow not pregnant whose belly hangs low, almost touching the ground, seldom produces large litters or fine pigs; the pendulous condition of the abdomen is the result of weakness and relaxation from ill-feeding and ill-breeding, neglect, with other causes, and is generally accompanied with flat sides, a long snout, and a raw-boned unthrifty carcase, yielding coarse meat, which will not repay the outlay of feeding.

Though a sow is capable of breeding at the age of seven or eight months, it will be advisable not to admit the boar until she be about ten months old. Early breeding not only weakens the sow, but as her physical powers are not yet fully developed, results in the production of undersized weakly pigs, and perhaps incomplete as to number; and these perhaps she will scarcely be able to nourish. On the contrary, a good sow, put to the boar at the age of twelve months, will bring forth ten or twelve pigs, and the same number at a second farrow within the twelvemonth. A young sow of good stock, who produces a large litter at her first parturition of pigs, all of equal size, and proves a good nurse, is valuable; she promises well, for her first litter may be taken as an example of those to succeed. As long as such a sow continues to return to the breeder such litters twice a-year (for we object to taxing her constitution three times within the twelvemonth), he will do well to keep her, more especially if he finds upon trial that her progeny fatten kindly, whether as porkers or bacon hogs. Some persons, after obtaining one or two litters from a sow, have her spayed, and then fattened off as quickly as possible for bacon. Some keep to their second or even third year of breeding; but if the last litter was good, and the sow continues vigorous, it becomes a question how far it may not be more advantageous to keep her still longer, even until the diminished number of pigs produced indicates a decline of fruitfulness. The more numerous the progeny of a sow at a single parturition, the sooner will this declension come on, and for obvious reasons—her system has been taxed to the utmost. On the other hand, if a young sow, at her second parturition, produces less than eight pigs, the sooner she is fattened off the better; but if ten or twelve are the produce of a young sow at her second parturition, we should certainly hesitate before we sealed her doom.

As the sow will receive the attentions of the

boar at all seasons of the year, the time of her parturition may be easily arranged. Generally speaking, little attention is paid to this point; but it is of importance, for, as we have said, cold sleety weather, with keen winds, is very detrimental to young pigs, and not favourable to their mother; hence, early in the spring, and late in the summer or early in the autumn, are the best periods of the year for the production of the litter. In the spring, the fields and paddocks offer fresh grass and various vegetables, and a run upon the pastures will be not only a saving to the farmer, but of benefit to the young pigs; besides which, at this season of the year, whey and buttermilk are abundant, and so continue to be during the greater part of summer. An autumnal litter, again, will have sufficient time to grow and acquire strength before the severities of mid-winter; besides, the refuse of the potato crop, and the carrot-beds, of the garden generally, and of the mill, is now at hand in abundance.

A breeding sow should never be overfed; not that she should be starved—on the contrary, she should be kept, by a judicious allowance of food, in good condition and perfect health, but not fat. A sow when fat is not likely to be fertile, and, moreover, her parturition is sure to be more difficult and dangerous, and her milk in insufficient quantity, perhaps even of inferior quality, while her unwieldiness renders her more liable to overlay her young. When with pig she should have a commodious and clean sty to herself, and be supplied with sufficient straw to render her comfortable. She should be sufficiently fed, and all her wants supplied. All sources of irritation or annoyance should be avoided, and especially as the time of parturition approaches. From these causes—sometimes, perhaps, from craving hunger—a sow will devour her young; it is said also that if she be allowed to devour the after-birth, a morbid appetite, leading her to fall upon her litter, will be engendered. For these reasons the sow should be carefully watched and fed, especially if the parturition be her first; and not for these reasons only, but lest her parturition should prove dangerous or in any way difficult.

On no account should two pregnant sows be placed in one sty, however commodious. They will assault each other, and at last, perhaps, destroy each other's young.

"Selection, with judicious and cautious admixture, is the true secret of forming a breed." It is thus that all our improved breeds of domestic animals have been produced, those of the hog not excepted. Hence the old, coarse, large-boned swine have now almost disappeared, and given place to small-boned breeds, apt to fatten, mature at an earlier age, affording more delicate meat, less expensive to keep, and, therefore, altogether

more profitable. Such breeds are rapidly extending themselves, and improvements are going on. Many landed proprietors pride themselves on the possession of a particular breed of their own establishment, and remarkable for good qualities of every kind. In the establishment of such a stock, indiscriminate selection, and a repetition of crosses, with no definite object, must be avoided; while, at the same time, a pertinacious adherence to the plan of breeding in and in from the same stock, however excellent, will ultimately result in its degeneracy. Comparatively speaking, it is only within a few years that the improved breeds of pigs have risen up to reward the skill of the breeder. The Chinese or Siamese, the Neapolitan, and the African varieties have greatly contributed to their creation, and continue to modify those in which a farther cross is desirable. After one or two crosses, the best progeny is generally selected to inter-breed again with the original stock, and thus is its improvement effected. Among the numerous admirable breeds which now exist, it would be difficult to say which has the superiority, or which it is most profitable and advantageous to rear. As in the case of cattle and sheep, much depends on contingent circumstances, on locality, and the kind of food most readily obtainable. No doubt each breeder prefers his own strain. Berkshire and Essex boast of their respective races; Yorkshire, Suffolk, Sussex, and Bedfordshire put in their claims for praise.

That great attention should be paid to the hog especially in a country like England, and when we consider its importance as a flesh-giving animal, is not surprising. There is, in fact, no part of the hog, its bristles excepted, which is not consumed; the very intestines are cleansed and knotted into chitterlings, by many persons exceedingly relished; the blood, mixed with fat and rice, is made into black puddings; the skin of pork roasted is a *bonne bouche*; at few tables a roast sucking pig is not hailed with satisfaction; salt pork and bacon are in incessant demand, and are important articles of commerce. Great quantities are prepared in Ireland for exportation, and great quantities are also prepared in England. It is stated by Dr. Mavor, in his *Survey of Berkshire*, that at Farringdon fully 4000 are annually killed and cured.

One great value of the hog arises from the peculiarity of its fat, which, in contradistinction to that of the ox or that of the sheep, is termed lard, and differs from them in the proportion of its constituent principles, which are essentially *olein*, or *elain*, and *stearin*. All fats agree in being insoluble in water. It may not be uninteresting to the reader to know the distinguishing characters of the fat of our three most important flesh-giving domestic animals.

Ox Fat.—When this has been fused, it begins to solidify at 98°, and the temperature then rises (on account of the evolution of latent heat) to 102°. Forty parts of boiling alcohol of sp. gr. 0·821 dissolve one part of it, and it contains about three-fourths its weight of stearin, which is solid, hard, colourless, not greasy, and of a granular texture. It fuses at about 112°, and may then be cooled to 102°, when on congealing it rises to 112°. It burns like white wax. Of this stearin, about 15·5 parts are dissolved by 100 parts of anhydrous alcohol.

The olein of ox fat is colourless, nearly inodorous, and its specific gravity 0·913; boiling alcohol dissolves nearly one-fourth more than its weight.

Sheep's Fat, or *Mutton Suet*, greatly resembles that of the ox. It is, however, whiter, and, by exposure to the air, acquires a peculiar odour. After fusion, it congeals at a temperature varying between 98° and 102°. It dissolves in 44 parts of alcohol of sp. gr. 0·821. The stearin is white, translucent, and, after fusion, but imperfectly crystalline. About 16 parts are dissolved by 100 parts of boiling anhydrous alcohol. The olein of mutton suet is colourless. Its specific gravity is 0·913, and 80 parts of it are dissolved by 100 parts of anhydrous alcohol at 168°.

Hog's Fat, or *Hog's Lard*, is a soft colourless solid, which fuses between 78° and 86°. Its specific gravity at 60° is 0·938. By powerful and long-continued pressure between folds of blotting paper, it is stated to yield $\frac{62}{100}$ of its weight of colourless olein of specific gravity 0·915. Of this 100 of boiling alcohol dissolve 123 parts. The stearin of hog's lard is inodorous, solid, and granular, which, after fusion, remains liquid down to 100°, and then, on congealing, the temperature rises to 109°. It becomes acid by exposure to the air.

Different as are the qualities of stearin and olein, analysis shows that their composition is less remote than might be expected. The subjoined analysis of mutton may be taken as a general example:—

		Stearin.		Olein.
Hydrogen	.	11·770	..	11·090
Carbon	.	78·776	..	79·354
Oxygen	.	9·454	..	9·556
		100·		100·

From this digression let us return to our main subject. We have stated that one great value of the hog arises from the peculiarity of its fat. The great mass of this fat is laid on under the skin and between the superficial muscles. It is remarkable for "taking salt," and, thus imbued, constitutes either pickled pork or bacon (French, *du lard*; Latin, *lardum* or *laridum*), the latter being dried, and often also smoked. We have said that these are important articles of commerce, and

we may here add, that many hands and large capital are employed in the preparation of salted pork and bacon for the market. Bacon imported from Ireland arrives in a rough state generally, and is mostly consigned to bacon-curers, or, as they are often called, provision merchants, who complete the necessary processes, and render the flitches and hams fit for sale. It is impossible to give anything like a correct estimate of the number of bacon-hogs killed during the year in England, of the number of porkers killed for pickling, or of young pigs slaughtered for the table. The sum total, however, must be prodigious; yet, great as it may be, the market demands still further supplies. At the present time, February, 1848, there is a deficiency of bacon in the market, and its price is accordingly high. This state of things, doubtless, arises from the trouble under which Ireland is at present bowed down, and which has rendered it impossible for the peasantry to feed swine—nay, to feed themselves. This is no subject for us to dwell upon here. Ardently do we hope, and devoutly do we pray, that better days may soon return, and that the pig may again resume his wonted station in every cottage.

The following statistics, relative to the pickled pork and bacon trade, will at once demonstrate the importance of the hog. They relate merely the importations during the years 1844-5-6, as given by the Board of Trade:—

	1844.	1845.	1846.
Bacon Cwts.	36	54	2,768
Hams "	6,732	5,462	11,252
Pork Salted, British Possessions "	2,153	1,517	} 72,519
Do. Foreign . . . "	28,672	38,128	
Pork Fresh "	63	133	133
Total of Pork "	30,843	39,878	72,652

Of these three articles, there were entered for home consumption:—

	1844.	1845.	1846.
Bacon Cwts.	36	54	2,768
Hams "	3,568	2,603	8,385
Pork Salted, British Possessions "	248	172	} 72,519
Do. Foreign . . . "	1,073	1,289	
Pork Fresh "	63	133	133
Total of Pork "	1,384	1,594	72,652

The extraordinary increase in the importation of the above-mentioned articles of food is, doubtless, the result of the reduction of the tariff of 1842. That tariff operated disadvantageously in all respects, not only as it bore upon the supply of

the markets, but also upon the revenue itself; for though on the average it is reduced to half, the loss is far more than made up by the extent of the importations. The following is a *resumé* of the alteration which has taken place:—

	Old Tariff.		New Tariff.	
	s.	d.	s.	d.
On bacon from foreign countries, per cwt.	14	0	7	0
" from British possessions, "	3	6	2	0
On ham from foreign countries, "	14	0	2	0
" from British possessions, "	3	6	2	0
On salted pork from foreign countries, "	8	0	—	—
" from British possessions, "	2	0	—	—

Previously to the year 1842 the duty on foreign ham and bacon amounted to 28s., and on the same articles from British possessions to 7s.; the duty on pork—foreign, to 16s., from British possessions, 4s. Live swine were altogether prohibited; but when in 1842 their admission was granted (Act 5 & 6 Vict., cap. 27), the number imported, though at first small (the breeders having no stock to spare), soon became, as in the case of oxen, very considerable. For example, A.D. 1842, 415; 1843, 361; 1844, 269; 1845, 1598; 1846, 3443.

Thus, then, we find even in the importation of live swine a remarkable increase, and yet it is not felt either by the breeder or the provision merchant. The increase of demand is more than commensurate with that of the supplies, the more especially as there is, and has been, a failure in the supplies from Ireland, both as respects live stock and bacon. This defalcation has affected the markets, and still continues to affect them, very unfavourably for the buyer; but the home breeder finds his profit in the scarcity of Irish produce, and will no doubt pay an increased attention to his porcine stock, which he must perceive is rising in importance. In the years 1820 and 1825, the intervening years included, there was on the average a yearly importation of 204,380, or even 338,218 cwts. of bacon and hams from Ireland into England. What the present amount may be we cannot tell, for the duty being removed, and the trade having been placed on the footing of a coasting trade, the means of arriving at correct details are wanting. The imports have indeed been estimated at 500,000 cwt per annum, and were Ireland not suffering from causes which we need not here enumerate, we should think this estimate moderate; as things are, we fear that it is too high. Glad should we be to learn the contrary. In the mean time the value of the present animal is rising in our island. At the last cattle show (1847) in King Street, Portman Square, and also at the preceding, the results of attention to breeding and feeding in this description of stock were peculiarly manifest. Some of the animals, especially those

of the Essex and Coleshill breeds, were models. Many of the pigs were fattened to such a degree that their eyes were invisible, and they were themselves incapable of rising upon their legs. Excepting by way of test or experiment, this over-feeding can answer no useful purpose; the object, however, is to show what can be done in the improved races with pigs varying from thirteen to twenty-six weeks old, and from twenty-six to fifty-two weeks old. The food on which these animals were fed consisted of barley-meal, steamed potatoes, Indian corn, skimmed milk, peas or pea-meal, acorns, carrots, oat-meal, &c., varied according to the means or views of the feeder. The first prize pig, under twenty-six weeks old (eighteen weeks), of 1847, was fed on middlings, barley-meal, and milk.

"The keeping of swine," says Mr. Youatt, "is fast becoming something more than a mere means of disposing of offal, and matters which would otherwise be wasted; and we trust that the value and lucrativeness of this branch of rural economy will soon be fully acknowledged, and that swine will be duly estimated among farmers and breeders. The next step must of necessity speedily follow; men of science will no longer deem them beneath their notice; their habits, instincts, and ailments, will be properly studied; individuals as well as the world will be benefited; and a new and important field of knowledge thrown open."

Vancouver, in his *Survey of Essex*, makes the following judicious observations relative to the management and value of hogs:—"There is no animal in the whole economy of good husbandry that requires more attention as to breed, number, and supply of food, or will *better requite* the care and trouble of the farmer, than a well-managed and proper stock of hogs. These things, however, are too much overlooked, or rather disregarded, by farmers in general, though all are ready to agree that an overstock in other respects must ever prove fatal to the interests of the farmer. Hogs are too frequently conceived to be a trifling and unimportant part of the stock of a farm; whereas, if their first cost and the value of their food were duly considered with their improving value, it would certainly bear them out against some of the more costly animals, and challenge more care and attention than are usually bestowed upon them. A due regard to the breed which the peculiar circumstances of the farm may call for is particularly necessary, as some breeds are much better suited to pasture, and feed upon grass and herbs, than others. The most hardy and best qualified to prog for themselves are the Chinese, a cross with which breed upon almost any other may, under most circumstances, be prudently recommended. Let the breed be what it may, a well-proportioned stock to every farm will most

abundantly *requite the care* and *repay the expense* of the necessary food provided for them. A few acres of clover would be well applied to the use of the hogs in summer; but in the sty it would be well to restrain them to a certain quantity of water, and to lodge them clean and dry, notwithstanding the wilful neglect and too prevailing opinion to the contrary; for cleanliness is as essential to the preservation of their health and well-doing as to that of any other animal."

These views are very different from those of a writer in the *Quarterly Journal of Agriculture*, who says, "It is greatly doubted by many competent judges, whether swine form a profitable stock, at least when fed on food which requires to be raised for the purpose. The results deduced from calculations entered into, to show the probable return for a given quantity of grain, roots, or other vegetable produce, are, however, so discordant as to avail but little in the formation of a settled and conclusive opinion. In connexion with distilleries, dairies, breweries, and other large establishments, they are of much higher and assured importance, and return, in proportion to the offal they consume, a great quantity of meat. Their chief advantage as live stock probably consists in their being nourished by what would otherwise either prove nearly useless, or be entirely lost. When potatoes are raised as a fallow crop, exceeding the demands of human consumption, the rearing of swine for bacon and pickled pork becomes an advisable branch of rural economy."

No one, we presume, would keep pigs without having the means of feeding them at his command, all necessary conveniences, and a proper system of management. Under such circumstances they will return ample profit, a fact well known in America, where the hog is important to a degree elsewhere unknown, Ireland not excepted. Mrs. Trollope, and Mr. Lyell, the celebrated geologist, speak of Cincinnati as a sort of hog metropolis. The former, in her *Domestic Manners of the Americans*, utters the following complaints:—"I am sure I should have liked Cincinnati much better if the people had not dealt so very largely in hogs. The immense quantity of business done in this line would hardly be believed by those who had not witnessed it. I never saw a newspaper without remarking such advertisements as the following:—Wanted immediately, 4,000 fat hogs. For sale, 2,000 barrels of prime pork. But the annoyance came nearer than this. If I determined upon a walk up the main street, the chances were five hundred to one against my reaching the shady side, without brushing by a snout or two fresh dripping from the kennel. When we had screwed up our courage to the enterprise of mounting a certain noble-looking sugarloaf hill that promised pure air and a fine view, we found the brook we

had to cross at its foot red with blood, from a pig slaughter-house; while our noses, instead of meeting the thyme that loves the green hill's breast, were greeted by odours that I will not describe, and which I heartily hope my readers cannot imagine. Our feet, that on leaving the city had expected to press the flowery sod, literally got entangled in pigs' tails and jaw-bones, and thus the prettiest walk in the neighbourhood was interdicted for ever."

Mr. Lyell, after noticing the pigs, which wander at their pleasure about the streets, acting the part of scavengers, but perfectly independent, says, "The pork aristocracy of Cincinnati does not mean those innumerable pigs that walk at large about the streets as if they owned the town, but a class of rich merchants who have made their fortunes by killing annually, salting, and exporting about 200,000 swine. There are, besides these, other wealthy proprietors, who have speculated successfully in land, which often rises rapidly in value as the population increases. The general civilization and refinement of the citizens is far greater than might have been looked for in a state founded so recently, owing to the great number of families which have come directly from the highly educated part of New England and have settled here. As to the free hogs before mentioned, which roam about the handsome streets, they belong to no one in particular, and any citizen is at liberty to take them up, fatten, and kill them. When they increase too fast, the town council interferes, and sells off some of their number. It is a favourite amusement of the boys to ride upon the pigs, and we were shown one sagacious old hog who was in the habit of lying down as soon as a boy came in sight."

The large hog establishments in America are conducted upon a regular system, and are sources of great profit to the proprietors; great pains have been taken with a view to the improvement of the old breeds, which were flat-sided, coarse, and ungainly, by the intermixture of the Berkshire and Chinese strains, not without success. A writer in the *New York Herald* thus notices the characters of the pigs exhibited at the fifteenth annual fair in that city:—"The swine were fairly represented in the Berkshires, Chinas, and their crosses. There were some beautiful specimens of these, and if any one doubts that it is the corn-crib that makes the pork, let him scan closely the fine forms, thin hair, mellow elastic handling, delicate limbs, and quiet countenance, expressive of peace with all the world, exhibited by some of the grunters inside the yard, and their Hammish kindred without—a roaming, restless, thriftless brute, with legs reaching to the backbone, the bristles of a porcupine, the hide of a rhinoceros, and all the grim aspect and unthrifty look of a wolf or hyena,

thrice cursing the human race—a curse to their neighbours, a curse to their feeders, and a curse to their eaters."

If this animal is profitable to proprietors of large establishments, to great distillers, to millers, to farmers and dairymen, so it is to the labouring peasant, who cultivates a little garden, and collects the refuse of the kitchens of his wealthier neighbours; he will have two or three litters in the course of the year, saleable as "sucking pigs" at the age of three or four weeks, and at Christmas he will kill two, three, or four fat pigs, and find a ready sale for the meat, besides turning part into bacon for his own family. This is no theory; we ourselves know those who act upon the plan, and find it a source of profit and comfort. It will not, however, do for the idle or the improvident; it demands industry, order, and forethought, and that assistance, which, while the man is going on with his regular work, his wife or some part of his family can render.

Exclusive of bacon, hams, &c., great is the demand for fresh pork throughout our island, much greater indeed than formerly, and this is in some measure owing to the improvement of our breeds; our porkers are small sized, with fine grained delicate flesh, and firm fat, sufficiently but not superabundantly laid on, and the skin is thin and clear; the limbs are round and fine boned. Such is the country-fed pork to be seen in London and in other towns. Formerly such pork was never sent to market, and in some counties it is still unknown. We allude to the more northern of the midland counties, and those still farther north. A relative farming in Derbyshire, and on a visit to the author, expressed his surprise at the smallness and delicacy of the dairy-fed pork placed upon our table. His idea of fresh pork was limited to spare-ribs, and griskins of bacon hogs; and he deemed the destruction of young porkers for food utter folly. He forgot, perhaps never reflected, that these younglings, by quick returns and good profits, remunerated the farmer, miller, or dairyman far more than they would have done if kept to be bacon-hogs, and fed up to the proper pitch. Fine young pork (January, 1848), the porkers averaging from 55 to 65 or 70 lbs., when cleaned and dressed, is selling at an average of 9d. and 10d. per lb. Cured bacon (the supply from Ireland having failed) is selling in the shops at 11d. and 12d. per lb. Now, taking into calculation the amount of food, the time, the trouble, &c. of rearing bacon-hogs, and converting their sides into bacon, and their thighs into hams (the latter certainly selling at 12d. per lb.), compared with the food, time, and trouble of rearing porkers (in immense demand) at the average ratio of 9d. and 10d. per pound (porkers ripening rapidly, and weighing, for size, heavily), and we

shall find that the plan of selling young stock, prepared for the market, will be, on the whole, the most profitable. No doubt the large pig-owners follow both practices; yet, since the improvements of our stock, it is undoubted that in and about London, and in the southern counties generally, the demand for small delicate pork has been on the increase, and that the number of pork-butchers who deal in fresh pork, home-cured pickled pork, and pork sausages, but not in bacon or hams, has been on the increase. We could mention a town, within thirty miles of London, which, when we visited it upwards of twenty years ago, had not one pork-butcher (that is, regularly stated as such) in the place. There are now three or four, the number of ordinary butchers being about six, perhaps seven. We are now speaking of a town in Surrey; we can say the same of towns in Berkshire—nay, of villages in both these counties and others adjacent; but in the more northern parts of England the shop of a pure pork-butcher, as we in London understand the term, or that of a grocer or general dealer, exhibiting *porkers* hanging up most invitingly for sale, is indeed a rare spectacle. Our younger days were passed in Derbyshire, Staffordshire, Cheshire, and Lancashire; and, in these counties, often have spare-ribs graced the board at which we sat, and sucking pigs also, but never the dairy pork which we *now* can produce in and around London. We say *now*, for we are told that, thirty years since, such was not attainable. We can only attribute this to the improvements of our breeds, and the improvements in stock-keeping and stock-feeding, conjointly with the demand for an improved article.

We have sufficiently demonstrated the value of the pig as one of the flesh-producing animals which man has reclaimed. Throughout the whole of Europe, and the greater portion of America, the flesh of the hog, fresh, salted, or cured, is in constant demand; nor less so the lard, which is required by the cook, by the apothecary, and by the perfumer.

We must not forget that China is a great pig-rearing and pig-consuming empire. Near as their country borders upon regions where the pig is detested or neglected, the Chinese have no such prejudices. They rear this animal in immense numbers; indeed, of all their domestic quadrupeds, none are so abundant or so universally kept. Few peasants are without a breed of them; and even the numerous population who tenant the floating town of rafts or barges on the river Canton, contrive to rear and keep them. But we need not insist upon this point. Who questions the importance of the hog as a flesh-producer, excepting the Jew, the Mohammedan, and the Hindoo? In the regions of the rein-deer the hog is not reared;

the reasons are too obvious to require recapitulation.

No part of the hog, as we have said, is useless; not even its bristles or its skin.

The bristles of our fine-bred races are perhaps of no value—they are generally short, slender, and thinly set; but in the coarser breeds they are long and strong, firm and elastic. The export of bristles alone from Russia and Prussia into our country forms no inconsiderable item. We need not detail their various uses—they constitute the essential part of all kinds of brushes; nor can the shoemaker dispatch his work without them. In the year 1828, hogs' bristles to the amount of 1,748,921 lbs. were imported from the countries before-mentioned. Mr. Youatt calculates that the number of bristles, averaging each at the weight of two grains, would amount to 13,431,713,280. As these bristles are taken only from the top of the hog's back, each hog cannot be supposed to have supplied more than 7,680, which, reckoning a bristle to weigh two grains, will be one pound. Thus, he infers, that in Russia and Prussia, during the year 1828, 1,748,921 hogs and boars were killed to supply the consumption of bristles in England.

This calculation must be taken with allowance. There is a very great difference in the quality, and consequently in the weight of bristles, and quantity yielded by different animals. Besides, bristles lose much of their original weight after undergoing the processes of cleansing, bleaching, &c. We find, for example, that six bristles of a common sweeping brush do not weigh more than three grains, but they have evidently been deteriorated by preparation and shortened. Still we cannot help thinking that the *average* weight of bristles, taking those of every quality into consideration, is under two grains each. Some, of course, may exceed this weight, while others will be much below it.

Horse-hair cordage—that is, ropes in which a great quantity of horse-tail hair is intermixed—must be familiar to every one. In the Orkneys ropes are made of the bristles of the small rough semi-wild breed of swine indigenous in those islands. These ropes are used by the cragsmen, who are lowered over the terrific precipices in quest of the eggs of the myriads of sea-fowl breeding on the ledges, or of the young or adult birds. Ropes thus constructed are less apt to fray against the sharp edges of the projections of the rocks than those made wholly of hemp.

With respect to the hide of this animal, it is, when tanned, of a peculiar texture, and very tough. It is used for making pocket-books, and for some ornamental purposes, but chiefly for covering saddles. The numerous little variegations in it, and which constitute its beauty, are the orifices whence the bristles have been re-

moved. According to Mr. Arthur Aiken, this leather comes "from Scotland and Yorkshire; for though hogs are abundant in every part of the country, the general custom of cooking pork with the skin on greatly restricts the supply."—See *Trans. Soc. of Arts*, vol. 1.

To what extent hogs' skins are imported into our country we cannot learn. We cannot, however, suppose that the saddle-maker depends exclusively upon the home supply of this article.

There is another point relative to the hog which we must not omit to notice. We allude to the value of the dung and urine as manure. This has been, and still is, too much neglected. Nevertheless, this manure is really of importance, being peculiarly adapted for cold soils and grass lands. It should always be collected as carefully as that of the stable or cow-house, and husbanded in the same way. Those who keep extensive piggeries will soon find the advantage of this plan, which, besides the profit arising from the manure itself, will necessitate the keeping of the piggery in a state of cleanliness. A dirty sty or yard is a disgrace to the owner; it is the source of disease, and it involves the waste of manure of first-rate quality. The cottager who keeps a pig or two will find the utility of this manure in his garden, and, by due attention, he will prevent the litter or bedding of straw from becoming a mass of filth; thus in two ways effecting a saving.

From these views relative to the utility of the hog as a domestic animal, we may proceed to notice some of the principal breeds into which it has ramified, first attending to those of foreign countries, as far as we can glean any definite information respecting them.

FRANCE.—Few, we believe, have travelled in France and not noticed the gaunt, flat-sided, meagre pigs wandering about the villages he has passed through, or confined in the farm-yards. These pigs are long-limbed, with the ridge of the back arched; the chest is narrow, the head long, the ears slouching, and the neck thin. From their whole appearance, it is clear that no feeding would ever make them do credit to their keeper. Their colour is mostly white, but in Dauphiny, Languedoc, and Provence black pigs prevail.

The general defects in form and aptitude to fatten are acknowledged by the French writers themselves, and have been expressly commented upon by M. Magne (*Traité sur l'Élevé, Entretien, et Engraissement du Porc*). It must not, however, be supposed that no attempts have been made to ameliorate the native stock, or that these have not been to a certain degree successful. The Chinese and the Berkshire, and some others of our English breeds, have been imported for that purpose, and several new varieties have been the result.

According to Desmarest, the principal French breeds in 1820 were the following:—

1. *Race of the Pays d'Auge*.—The head small and very pointed, the ears narrow and pointed, the body long, the feet large and strong, the bristles rough, white, and rather scanty, the bones small. It attains to the weight of more than 600 lbs.

2. *Race of Poitou*.—Head long and massive, with the forehead abruptly elevated, ears large and pendent, body elongated, bristles rough, feet large and strong, bones large. Its weight never exceeds 500 lbs.

3. *Race of Perigord*.—Neck thick and short, body broad and compact, hair black. This race, mixed with others, has produced spotted pigs, common in the south of France.

4. *Race of Champagne*.—Large, with long and very flat sides; ears broad and pendent, hair white. It is a bad fattener.

5. *Race of Boulogne*.—Of moderate size, fattens quickly, ears very wide, colour white. It is a result of a mixture of the large English breed with the ordinary race of France.—(Desmarest, *Mammalogie*, p. 390.)

The race of the Pays d'Auge is by some called the Normandy breed. The pigs which we have seen in Normandy, were lank, greyhound-like animals, with long ears. They are ungainly animals.

Besides the above French stocks, Desmarest notices several others, not exclusively French, but resulting from intermixtures with breeds of different countries. Of these, one is

The Short-legged, or Smooth Pig.—It resembles very much the Chinese or Siam pig, from which it proceeds. The head is short, the jaws thick, the forehead stunted, the space above the eye is marked with folds, the ears are short, somewhat pointed, and almost upright; the neck is thick and short, the chest vigorous, the body round and elongated, the limbs short and strong, the skin very thin, the bristles slender and short; colour generally coppery, sometimes fiery red.

This sort of hog is of rather small size. It is fertile, and will fatten to such a degree that the belly will touch the ground. It is reared in Spain, in Portugal, in Tuscany, in Savoy, &c. The breed of the *Landes*, or, as they are called, wood-pigs (*Cochons des Bois*), in the neighbourhood of Bayonne, exhibit but little difference of character. Another breed is the

Porc de Nobles.—Stature small, head short and pointed, neck thick, croup long, broad, and rounded, ears short, small, and straight, limbs short and tolerably strong, bristles thickset on the back of the neck, colour white.

This strain, which originated in England, produced, says Desmarest, by M. Kortright (query,

Cartwright), is the result of a cross between a Chinese sow and a wild boar from North America. —(*Sanglier d'Europe transporté sur ce Continent.*) The flesh of this breed is said to be very delicate. Another breed in esteem is the

Porc de Witt.—Head short and fine, ears moderate, neck thick and round, shoulders broad and strong, flanks broad, back straight, croup large, broad, and rounded, limbs short, bristles white, abundant on the top of the neck, rare on the back. This sort, which exceeds the former in size, results from a mixture of the Chinese with the common race. It fattens quickly, and is very fertile. To this we may add another breed, called by the French

Porc de Zélande.—It has upright ears and a short body; the back is abundantly furnished with bristles. It is of small size, weighing, at the end of the second year, from 160 to 240 lbs. It appears to be a mixture of the Chinese breed with some others.

Other breeds have latterly been established, and, among them, those reared in the department of Mayenne and along the Oudon are particularly valuable, and indeed are expressly reared for the purpose of improving the more ordinary varieties. Two breeds are in repute; one is called the *Craon breed*. It is long in the body, short in the legs, extremely broad in the back, with well-developed lumbar muscles. It is not, however, an early fatterer, seldom beginning to make much flesh until towards the age of eleven or twelve months. It then fattens rapidly, and attains to a very great weight. Its want of precocity is a drawback; at least it would be so in our country, where the delicate flesh of the well-fed porker is in such extensive demand.

Another variety is termed the *Valley breed*. It is, like the preceding, very broad in the back, with a moderately long body, and short limbs; the ears are large, falling to the end of the snout, which is short and broad; the back is covered with bristles, and the extremity of the tail is tufted with the same. The under jaw is bearded something like that of a goat. Pigs of this breed fatten well and quickly, and may be rendered fit for slaughter at any age (*Revue Agriculture de Juillet*, 1840). M. Magne describes a variety under the title of the *Bressane breed*, prevalent in the province of Bresse in the neighbourhood of Lyons, of the Dombes, and Carolais, and through the department of Aisne. The pigs of this strain are of moderate size; the body is long and rounded, the legs are short, the ears long and pendulous, the colour blackish with a broad stripe of white encircling the body. The flesh is held in great estimation, being white and delicate.

For ourselves we must confess that in travelling in France we never saw a pig, the contour and

promising appearance of which pleased us. Generally speaking, inattention to breed was evident; the animals could not have laid on fat, however they had been fed, but fed they were not, unless grass and herbage picked up in the fields and lanes, or garbage appropriated in the streets of villages, be called feeding. It is true that we have not explored all France, nor made a journey on purpose to ascertain the characters of the different breeds, and the modes of treatment in France generally; were we so to do, we should no doubt see superior breeds, but then these are not general. If we travel through Essex, Middlesex, Berkshire, passing farm after farm, the sleek, round, good-looking pigs nestling in the straw-yard, cannot fail to attract our notice. We do not name these counties by preference; take Kent, take Surrey, especially around Dorking, take Sussex, or go northwards, and the same sight presents itself. Not so in France. Again compare the pork-shops in London with those of Paris; compare the pig-produce in any of our large or small towns, say Reading and Dorking, with that exhibited in the shops of towns of equal size in France, and the difference is palpable. We must not suppose that there is no demand for this produce in France; it cannot be compared, *cateris paribus*, to that in England, yet, as far as the consumption of meat goes, it forms half, perhaps two-thirds of that consumed by the middle and poorer classes. How often in the villages do we see the rude picture of a ham with a fork stuck into it, on the window-shutter or on the door, or on a board against the wall of a cottage or cabaret, indicative of the fare to be obtained within. But then, how is the *jambon* cured and cooked! Under such treatment it matters little what the quality of the meat might originally have been. Send in London to a proper shop for cooked ham, and send in Paris for the same, and, oh, how great the difference! But this is a matter of taste; the Parisians may prefer lean ham boiled or rather stewed to rags, to well-fed ham cooked in the English mode; and if so, they need not trouble themselves about their breed of swine. These of course are general observations on the ordinary state of things, as a traveller would observe them; and we are ready to admit that our views are superficial—in short, that France can produce breeds rivalling those of Essex and Berkshire, together with specimens which the judges of the Smithfield Club would deem worthy of contesting at their cattle-show for the prize. All we say is, that such animals of the porcine kind have never come under our notice. The following extract from the *Ann. d'Agricult. Française*, No. 29, presents us with the unsuccessful trials of a breeder to improve his stock:—"I commenced," he says, "with the *large* Shropshire pigs; they pleased my eye, and for some little

time I felt perfectly satisfied. In a short time, however, I began to observe that although they devoured an immense quantity of food, they fattened but very slowly, and seemed to derive no advantage from the herbage and vegetables which they found in the fields.

"When killed the flesh and especially the fat was exceedingly coarse. The sows nevertheless produced many pigs at each farrow, which from their size when young sold well to persons who were tolerably rich, and knew little or nothing about the breeding of pigs.

"I next tried the small Berkshire pigs, and immediately perceived a very sensible improvement. They fattened quickly, procured most of their nourishment from the fields, and their flesh was very superior to that of the last-named breed. But as they were large I thought to effect a still greater improvement by exchanging them for the Chinese; but here I fell into the opposite extreme. The Chinese were prolific, fattened speedily, and almost obtained their own subsistence; but they were faulty in form; and their flesh was not firm, but loose in fibre, as if they had died of disease."

In this account two things particularly strike us,—first, a want of definite aim or purpose, which would naturally engender an uncertain and desultory mode of proceeding. If a small compact breed was aimed at, or deemed desirable, why commence experiments by crossing with the large Shropshire race? A large coarse breed could never be much improved by such a mixture, and seeing that improvement was effected by the strain of the Berkshire, why not pursue the experiment diligently in the same channel?

Secondly, the mode of feeding. What kind of flesh could be expected from pigs which obtained most of their subsistence from the fields?

The swine of the Netherlands are mostly a large gaunt, long-legged race, great consumers and slow fatteners, but, when fed up to the mark, are said to make excellent bacon.

GERMANY.—The hog is an animal in great request throughout Germany, and everywhere kept in abundance. The old and common breed generally spread indicates its relationship to the wild race of the forest. These animals are large, gaunt, meagre animals with long heavy snouts, and coarse bristles, which clothe the brawny neck with a mane and run along the ridge of the back. We have already given an amusing account, extracted from *Bubbles from the Brunnens of Nassau*, relative to the system of their treatment, which does not appear to us to be very judicious, as their half-starved appearance demonstrates.

Westphalian hams are held in great esteem, and are cured principally at Hamburg for exportation. The breed of this district is of large size and very prolific, and when crossed with some

of the English races, the result is excellent, and consequently much valued.

In Prussia the swine are ungainly animals, generally of a yellow or reddish-brown colour. A breed exists in Bavaria remarkable for the smallness of the bones and for aptitude to fatten, but its flesh is said to be of inferior quality, being loose and flabby. The animals are spotted with marks of reddish-brown.

According to Thäer, the chief breed of pigs known in the north of Germany and crossed in various different ways are the Moldavian, Wallachian, and Bothnian pigs, remarkable for their enormous size, iron-gray colour, and large lapping ears; and the Polish, or properly Podolian, pigs, which are also very large but of a yellow colour, and have a broad brown stripe along the spine. These two breeds furnish the large pigs for fattening, but they consume a vast quantity of food, and the females are by no means productive.

Desmarest describes a variety under the name of *Le Porc Turc, ou de Mongolitz*, which is indigenous in Turkey in Europe, and extends through Hungary, Croatia, and Bosnia to the environs of Vienna in Austria.

It has short, erect, and pointed ears, the limbs short and fine, the body very little less long than high, and covered everywhere with slender bristles, very much crisped, and of a gray colour more or less deep, seldom black, and still more rarely reddish-brown. The young are grayish-white or reddish-brown, with black bands along the dorsal part of their sides. These animals weigh as much as three or four hundred pounds, and fatten in half the time the common French pig does.

Besides the varieties here noticed, the Chinese or Siam breed, and the Spanish or African black pig, are cultivated in Germany. The latter is highly valued for its aptitude to fatten, its rapid growth, delicate flesh, and excellent hams. It forms a most advantageous cross with some of the larger breeds.

HOLLAND.—Various breeds of pigs are to be met with in Holland, of which one, the Zealand, we have already mentioned in adverting to the swine of France. This breed is in great esteem, it is very fertile, fattens rapidly, and yields very delicate flesh. It evidently derives its origin from a cross between the Chinese and some indigenous breed.

DENMARK.—Desmarest describes a variety under the name of the Jutland pig (*Porc de Jutland*), characterized by its large and pendulous ears and its elongated body. The back is somewhat arched, the limbs long. The animals of this breed attain to a considerable size, insomuch that in the second year they will yield from two to three hundred pounds of bacon.

POLAND, RUSSIA, AND SWEDEN.—Throughout

these countries the prevailing breed is large, gaunt, long-snouted, covered with coarse bristles, and very fierce. The head is large, with the disc or terminal button expanded and turned up, the ears are erect, the limbs are long and vigorous, the shoulders massive. They live semi-wild in the woods, defending themselves and their young against the wolf, and in general habits as well as form approximate to the wild hog. Such, no doubt, was the ancient breed in our island under the Saxon dynasty, when vast herds roamed the woods under the care of keepers, the bond-slaves of the soil. We have already alluded to the impetuous ferocity with which the half-wild pigs in Sweden attack dogs, which they regard with the same hostility as they do the wolf.

SPAIN AND PORTUGAL.—A writer in the *Penny Cyclopædia* (article, Spain) says, "Pigs are not very numerous" in Spain. They are at least sufficiently plentiful, and both Spain and Portugal produce hams of very superior quality and flavour. "As for their tame swine," says a writer in *Bowen's Geography*, "all that have had experience of it allow that the Spanish bacon exceeds that of Westphalia." And we learn from the same authority that in Madrid the annual consumption of swine is about 13,000. The date of the work is 1747. Since that time such changes in Europe have taken place that *Bowen's Geography* may be left to rest quietly in oblivion. Nevertheless it notices a fact respecting Spanish bacon which still remains unchanged. We have ourselves enjoyed an opportunity more than once of partaking of Spanish hams; they were curiously cut, unlike English hams in appearance, but fat, and of delicious flavour.

We learn from John D. Hay, Esq., that in Spain and Italy a heavy fine is imposed on those persons who kill pigs during the *hot months*; and may not this account for the little we hear of the pig in *Don Quixote*, or in *Gil Blas*?

In an admirable work entitled *Portugal and Galicia* (1838), the writer observes that "large flocks of swine are seen upon the desolate wastes of Alemtejo, collected in numbers under the shade of the evergreen oak, and feeding upon the mast; and on this kind of diet they thrive wonderfully, and attain a prodigious size. The hams of Alemtejo are proverbially excellent, and indeed are not surpassed in flavour or quality by any in the world."

Wild boars, red-deer, and roes, as well as wolves, abound in the wild Alemtejo.

The writer of *A Summer in Andalusia* (1839) frequently alludes both to the pigs of Spain, and various preparations of its flesh, as "bacon exceedingly salt," "sausages," &c. He also notices the intrusive familiarity of the swine at the *ventas*, or rude halting-places on the roads. At one of these

ventas the traveller gives the following sketch of a strange scene:—"On waking I descended and found all asleep in the room below, my fellow travellers stretched on benches, and the muleteers on the ground, with saddles, sacks, cloaks, or *mantas*, for their pillows; while *pigs*, dogs, goats, and fowls, mingled with the human sleepers on terms of equality. The floor was of bare earth." On another occasion, while dining at a *venta* with other travellers and muleteers, he says, "Behind us a circle of hogs and dogs, attracted by the savoury fumes, pressed forward their snouts, and, poor petted things! were hardly to be driven back by blows."

During the rout to Malaga, he says, "I was much amused with the dexterity of a little boy who was driving some pigs along the road. When one was dilatory or inclined to wander from the rest, he adjusted a stone in a small sling, and never failed, by a smart blow, to recall the refractory grunter to sense of duty."

In the market-place of Malaga the din was increased by the incessant squealing of pigs, under the investigation of the buyers; for every hog "sings out most lustily whenever the state of his ribs is examined, verifying the proverb, 'If you want noise, buy a pig.'"

Mr. Borrow, in his work entitled the *Bible in Spain*, thus speaks of the swine of the Alemtejo of Portugal. "The country began to improve, the savage heaths were left behind, and we saw hills and dales, cork-trees and *azinheiras*, on the last of which trees grows that kind of sweet acorn called *bolotas*, which is as pleasant as a chestnut, and which supplies in winter the principal food on which the numerous swine of the Alemtejo subsist. Gallant swine they are, with short legs and portly bodies, of a black or dark red colour, and for the excellence of their flesh I can vouch, having frequently luxuriated upon it in the course of my wanderings in this province; the *lombo* or loin when broiled on the live embers is delicious, especially when eaten with olives."—Vol. i., p. 39.

In other places he mentions the hogs of Spain and their sties, pig-merchants, flitches of bacon, and dishes of bacon and eggs, and also a dish called *puchéro*, prepared by simmering over the fire, and in which bacon is one of the chief ingredients; it is in ordinary requisition. The same writer, in his account of the *Gypsies of Spain*, informs us that by means of some preparation called *drao* or *drow*, these people are not only in the habit of poisoning horses and cattle, which they cure for a certain sum of money, but also of destroying swine, in order that they may obtain their carcasses from the unsuspecting farmers as food. Sometimes they destroy the larger cattle from motives of revenge. We allude to these

facts to prove that there is no lack of pigs in the Peninsula.

From all this, however, we glean nothing positive as respects the Spanish or Portuguese breeds. Unfortunately the pig is an animal about which few travellers trouble themselves. Something we know of certain breeds of the sheep of Spain, but not of all. In fact, rural affairs are seldom touched upon by English travellers passing through any foreign country; and if they do offer any observations, their opinions are not worth much, for, in general, they are ignorant of all that relates to the *res rustica* of their own country. Personal adventures, political lucubrations, sometimes interspersed with statistics obtained often from fallacious sources, amuse or perplex the reader of volumes written rather to show off the traveller than the people among whom he has travelled. These observations apply to Spain and Portugal in an especial manner. Hence when we come to ask, in accordance with our present subject, of what character are the porcine breeds of these countries, we are unable to obtain any definite answer; zoologists are silent, travellers vague. Both in Spain and Portugal the wild hog exists, and we might quote an instance given by Colonel Napier of an unsuccessful attack upon one of these animals, not many miles inland from Gibraltar; but this would not be now to the purpose. Why do not travellers, instead of narrating their adventures at inns, and descanting on their good or bad dinners, or, on the other hand, entering into antiquarian researches respecting which no one cares at all, describe the productions of the soil as they are, the characters of the cattle, the views of the farmers, the management of land, and the demands upon its produce? For example, we may glean from *Don Quixote* that boys are in the habit of keeping grasshoppers, or rather cicadas, in rush cages, in Spain; but do they keep rabbits or guinea-pigs? What know we of the farmers of the great peninsula, or of the mode in which their stock is managed? the sheep of some districts being excepted. With respect to the various domestic breeds of swine in Spain and Portugal, we are almost completely in the dark. Of one breed we are told that it is short in the head, long and round in the body, short in the limbs, with a fine skin, and slender bristles; it is generally of a reddish-brown or copper colour, and is small in size, very prolific, and may be fattened to an enormous weight, relative to stature. This breed is found in Portugal, and also in some parts of Italy.

MALTA.—This island is celebrated for a small black breed of pigs, compact and round in form, with a thin skin, almost destitute of bristles; it fattens readily, and affords pork of noted delicacy. It has evidently either been transported into

Italy, or, on the contrary, has been originally derived from that country, where a similar variety is prevalent.

ITALY.—In the marshy plains of Polesino, in the neighbourhood of Ferrara, the pigs are of an indifferent breed, being gaunt and long limbed, but in other districts the breeds are many of them excellent; as, for example, that of Bosco on the Apennines. The animals are black, and well formed. During the summer they are suffered to wander over the mountains, but are housed during the winter, and fattened on chestnuts and milk. Count Chateauvieux found a herd of two thousand black pigs at the farm of Campo Morto; they wander all the year on the immense tract of land which extends towards the sea, and are fattened on nuts and acorns. Their flesh is very excellent. These pigs have been brought to the farm of Campo Morto in order to stock the woods, and are considered by the proprietor as very valuable property; their keep costs little or nothing, and they return a good profit.

The Neapolitan breed is celebrated in our country, and great numbers of Neapolitan pigs have, at different times, been imported for the purpose of crossing with some of our native races. The Neapolitan pig is small, black, almost destitute of bristles, and remarkable for aptitude to fatten; it is short in the snout, small in the bone, with sharp erect ears. But it is by no means hardy, at least in our country, and if the sows happen to have litters in winter, it will be difficult, should the weather be severe, to save the young pigs from dying. But as a cross with some of our breeds, as the Berkshire variety, the Neapolitan race is most valuable. The cross-breed exhibit improvement in form without too great a delicacy of constitution; they have a remarkable tendency to fatten, and, though larger and stronger than the pure Neapolitans, display all their good qualities. The Essex breed is much indebted for its excellences to the Neapolitan intermixture.

A very fine breed of swine prevails in the Duchy of Parma; indeed, it is generally regarded as the finest in Italy—it exceeds the Neapolitan in size, and is admirable in form, and by its ready fattening brings a quick profit.

Besides these there are mixed breeds of pigs of excellent quality dispersed through Italy; nor is this to be wondered at, when we reflect that the ancient Romans made the art of breeding, rearing, and fattening pigs a study—that they elevated, so to speak, various strains to the highest perfection. We cannot doubt that from those improved races of antiquity the present pigs of Italy have descended, for, unlike the sheep, the pig is valued for its flesh alone, and, through whatever political or moral changes the country

might pass, interest would suggest to the owners of the land the maintenance of the established stocks. In the sheep the wool and the carcase interfere with each other; not so in the pig—the breeder has only one object in the breeding and rearing of this animal. It is not, then, we think overstraining the mark, to regard the excellent breeds of pigs in Italy as the descendants of a long line of ancestry—of breeds established before Rome fell, and still preserving their pristine qualities, in the same climate, under the same sky, although the masters of Italy are no longer the same.

A great quantity of pork is consumed at Rome during the winter, the only time of the year at which, in a hot climate, this kind of diet is wholesome. The picture of a Roman slaughter-house for pigs is thus sketched by Mr. Waterton. "As you enter Rome at the Porta del Popolo, a little on your right is the great slaughter-house, with a fine stream of water running through it. It is probably inferior to none in Italy for an extensive plan, and for judicious arrangements. Here some seven or eight hundred pigs are killed every Friday during the winter season. Nothing can exceed the dexterity with which they are dispatched. About thirty of these large fat black pigs are driven into a commodious pen, followed by three or four men, each with a sharp skewer in his hand, bent at one end in order that it may be used with advantage. On entering the pen, these performers, who put you vastly in mind of assassins, make a rush at the hogs, each seizing one by the leg, amidst a general yell of horror on the part of the victims. Whilst the hog and the man are struggling on the ground, the latter with the rapidity of thought pushes his skewer betwixt the fore leg and the body quite to the heart, and then gives it a turn or two. The pig can rise no more, but screams for a minute or so and then expires. The process is continued until they are all dispatched, the brutes sometimes rolling over the butchers, and sometimes the butchers over the brutes, with a yelling enough to stun one's ears. In the mean time the screams become fainter and fainter, and then all is silence on the death of the last pig. A cart is in attendance; the carcases are lifted into it and it proceeds through the street, leaving one or more dead hogs at the different pork shops. No blood appears outwardly, nor is the internal hæmorrhage prejudicial to the meat, for Rome cannot be surpassed in the flavour of her bacon, or in the soundness of her hams.—"Essays on Natural History.

Though swine in ancient times were kept in abundance at the farms of Italy, yet it would appear that Rome derived great supplies of bacon from Gaul. "E Galliâ apportantur Romam pernæ, tomacinæ et petasiones" (*Varro*), that

is, "From Gaul are brought to Rome, hams, sausages, and gammons."*

ASIA and the SOUTH SEA ISLANDS.—Throughout the greater part of Asia the hog is neglected and despised. We have already alluded to the village hogs of India, which wander about unowned, acting the part of scavengers, and disputing with the pariah dogs for the possession of the offal matters thrown out from the houses. When, however, we come to China the case is very different; the Chinese, the Japanese, and other nations of Eastern Asia, are extensive breeders and feeders of swine. The prevailing race is that which we call the Chinese or Siamese, and which is largely crossed with some of our own varieties. These pigs are some black, some white, of small size, remarkable for their fertility, as well as for their aptitude to fatten; the head is short, the ears erect and pointed, the snout sharp, the cheek wide, the carcase deep, the shoulders and hams large, the legs short and fine boned, the hair thin; when the sow is in pig her belly touches the ground. The young of the Chinese breed in our country, especially of the white variety, are excellent as roasters at three weeks or a month old; they are small and fat, with little bone, and their skin is very delicate. They also make excellent porkers at three months old, when kept some time after weaning on the refuse of the dairy. They may be kept fat from the time they are weaned till they are fit to be killed for bacon; and although they do not come to a great size, they will pay very well for their food if killed at a twelvemonth old.

The Chinese pay great attention to their pigs, for these creatures constitute their principal supply of animal food. Pork indeed is very plentiful in China, but according to Mr. Lay (*The Chinese as they are*) it is by no means pleasing either to the eye or the taste of a European; it has a shining flabby appearance, and is so gross, that it is only tolerable when cut into thin slices and fried in soy, a mode of cooking it which we should think must totally destroy all natural flavour. Perhaps Mr. Lay, from the warmth of the climate, lost that keen appetite which gives the best relish to food, and therefore felt a disgust towards fat pork. According to the same authority the natives cut it into long slices, which they dry in the sun; thus prepared it is not unpleasant in flavour, although it is by no means easily distinguishable from the flesh of dogs or cats similarly prepared.

It is not often that pigs are driven from place to place in China; they are transported in a sort of cradle, suspended from a pole carried by two men. The motive for this most probably is to prevent

* "Non edi quicquam præter olus, fumosæ cum pede pernæ," Horace, *Serm.*, Lib. ii., Sat. 2, line 117. Are we to understand by the term "fumosa perna," smoked ham?

the fat tun-bellied animals from becoming exhausted, or losing any of their smooth rotundity. Perhaps it may be to save trouble. There is however some difficulty in getting the animal into its conveyance. "This (says Mr. Lay) is accomplished by the cradle being placed in front of the pig, the owner then vigorously pulling at porky's tail, when in the spirit of opposition the animal darts into the place they have prepared for him. At the journey's end, the bearers dislodge him by spitting in his face."

A small breed of pigs, very similar to the Chinese, was found by early navigators to prevail through the South Sea Islands. When the Europeans first visited Tahiti the natives were in the possession of pigs, dogs, and fowls, animals which doubtless owed their introduction to the ancient colonists of Malay origin, who peopled these distant spots of land in a wide ocean. To their pigs the islanders paid great attention, and the animals being fed on the fruits of various trees, and on roots, and other vegetables, always presented a plump appearance. Those who have tasted roast pig in these islands describe it as delicious food; the meat being extremely juicy and tender, and the fat, though rich, delicate and digestible. The mode in which the natives cook their young pigs is admirable, and well calculated to prevent the escape of the juices. A small pit is dug, and carefully lined with stones, a fire is then kindled in it, and kept up till the stones are heated sufficiently, the embers are then removed, and the pig, wrapped up in leaves of the bread-fruit tree, put at the bottom; it is covered with leaves again, then with hot stones, and lastly with earth; when ready, experience having taught the necessary time, it is taken up.

This breed of pigs is found in the Marquesas, the Society Islands, the Friendly Islands, the New Hebrides, &c., but it did not extend to New Zealand. The pig is one of the domestic animals introduced into that island by Europeans, and is now become very abundant. It is fed and fattened chiefly on the fern root.

Pigs are plentiful in the Philippine Islands (except in Magindanao, where the inhabitants are Mohammedans), and the woods swarm with deer or wild hogs. We cannot however definitely state what the character of the tame breed is, nor know we whether the wild hogs are specifically identical with the common species, or the contrary.

In New Guinea, and probably in the Moluccas, a wild hog of small size, the Bène of the Papuans, and which is regarded as a distinct species (*Sus Papuensis*), is caught when young and reared for the sake of its flesh; but we have already noticed this animal, of which little appears to be known.

In Ceylon hog's flesh is in great request, and constitutes the most approved and epicurean dishes

at all feasts or entertainments of consequence. Little pains, however, are bestowed upon the breeding or rearing of swine; they wander about at large, picking up what they can, and are seldom penned up in sties in order to be fattened. They are gaunt and long-legged; but, from the information we have gained, might be greatly improved by judicious treatment. Wild hogs abound on the plains of the eastern provinces, where elephants are still numerous. Whether the Ceylonese wild boar is a distinct species or not, we have no means of ascertaining.

AFRICA.—We have seen that the wild hog is abundant in Northern Africa; there are, however, domestic breeds which are noticed by Desmarest, but respecting which we have little to communicate.

One he designates as the Cape of Good Hope Pig (*Cochon du Cap de Bonne-Espérance*). It closely resembles, he says, the Chinese or Siamese hog, but is smaller, the hair is black or dark chestnut, bristly and harsh, but scanty; the ears are straight, the tail pendent, and terminated by a tassel of bristles, "un peu gaufrées" (that is, crimped or figured as by a machine). This variety is probably derived from India; it appears to be identical with that stock which prevails through the islands of the Southern Ocean, in Southern Africa, and in some parts of South America.

Another breed he describes as the hog of Guinea (*Cochon de Guinée*). Its head is rather small, the ears are long, narrow, and very pointed; the tail is long, destitute of hair, and almost touches the ground; the hair on the body is short, red, glossy, and finer and softer than that of other hogs; that on the neck and the croup is somewhat long; the back is naked. Size that of the Siamese hog.

"According to travellers, this—an aboriginal of Guinea—has been transported to Brazil.

"It may be that the Siamese hog, the hog of Guinea, and the Turkish and Russian hogs, are not the descendants of our wild hog, but of several entirely distinct species."—Desmarest.

To this view of the subject, which some naturalists of the present day are inclined to adopt, we have already alluded. If they be correct, the theory of the non-intermixture of species must be altogether abandoned.

AMERICA.—As we have before stated, the hog introduced originally from Europe has abundantly multiplied in America, inasmuch that, as is the case with the horse and the ox, troops of wild swine wander through the woods, particularly in Columbia, Brazil, Paraguay, and the Falkland Isles. These animals afford both sport and profit to the hunter, for their flesh is excellent.

It is not, however, to the wild swine that we now call attention, but to the domestic breeds, which within the last few years have become greatly improved.

In Canada the hog is a very important animal, and vast numbers are slaughtered in the cold season, not only for home consumption but for exportation.

Great business is now "done" in pork, and sleighs loaded with hogs are busily driving about, or carrying their load to various towns. Vast is the supply which Montreal receives; and vast is the quantity consumed, or pickled for exportation. The breeds are various but mostly good.

Head, in his journey from Halifax to Upper Canada, frequently adverts to the fine pigs which attracted his notice, and speaks of the delicious pork with which he was regaled by the settlers in various localities. Pork, fresh and pickled, constitutes the chief supply of animal food on which the new settler has to depend, especially in remote stations. Pigs therefore constitute an important portion of the stock of every farmer. In remote districts bears often prove very troublesome; they are said to be peculiarly partial to pork, and they not unfrequently invade the farm-yards, and carry off a squeaking and vainly struggling victim.

Throughout the whole of the United States, the hog is reared in abundance. In some parts they are kept in the woods and nurtured on chest-nuts and apples; before being killed, however, they are supplied liberally with rations of Indian corn, barley meal, and often with steamed food. In South Carolina, as we are informed by Stuart, the climate is so mild that the pigs are allowed to wander about the woods during the whole year, feeding on the nuts, acorns, &c. which are very abundant, and occasionally eating the fallen fruit they meet with. They are, he adds, very useful in destroying snakes.

The old unimproved American pig, such as those seen in the streets of New York, where they are the only effective scavengers, is a coarse unsightly animal, gaunt, long snouted, and long limbed. But there are now many superior breeds, resulting from various crosses with the Chinese and improved Berkshire stocks. The Berkshire hog is especially in request, and sells at a high price; it is noted both for the excellence of its flesh and its aptitude to fatten. A pig-breeder thus details the results of his own experience:—"The Americans are so partial to this breed, that I have sold sucking pigs weighing from 30 to 32 lbs. each, when seven or eight weeks old, at 50 dollars for a sow pig, and 30 dollars for a boar. I sold a sow pig of eight weeks old for 70 dollars. I knew a pair of pigs of this breed, killed at the age of one year and a quarter, which weighed 41 stones; thus, the pig's age being 456 days, and his weight 574 lbs., he must have increased at the rate of more than 1½ lb. per day."

The Berkshire breed is now very general over the whole of the United States; but besides this

there are several other stocks of great value, the result of judicious crossings, so that the gaunt pariah hogs of the streets of New York, and some other towns (not, however, Boston or Philadelphia), are exceptions to the rule, and not the representatives of the esteemed breeds of the States. To the improvement of this animal, as well as that of all our domestic cattle, the establishment of agricultural societies and stated shows materially contributes, by exciting a spirit of emulation, and by leading men to publish the result of their experiments, their failures, or the modes by which they attained their object. It is not the fattest animal that ought to claim the greatest attention or commendation, but that which shows the best points, combined with a tendency to lay on fat rapidly, and at little cost, returning great weight for size and age.

Mexico rejoices in her fine breeds of pigs, and these animals are kept in great numbers, both for home consumption and for exportation, and their breeding, rearing, and feeding, are conducted with great care and judgment. Many persons have large establishments, erected at considerable cost, in which the fattening, the killing, and the curing, &c., are managed, and the profits are considerable. Pork is in great demand in Mexico, as is also lard, which in cooking is universally used instead of butter, which in that country is not easy to be procured, although cattle are abundant both on the table-lands and the lower districts, and jerked beef and horns are articles of export.

Bullock, in his *Six Months' Residence and Travels in Mexico*, says, relative to pigs, "A fine breed of these useful animals is kept, by several persons of wealth, as an article of trade in the city of Mexico, and the care and attention paid to their cleanliness and comfort, so far exceeds anything I have seen elsewhere, that a short account may be useful, by furnishing hints to our farmers, brewers, distillers, &c., by whom large numbers of these valuable animals can be kept. The premises where the business is carried on are extensive, consisting in general of a good dwelling-house, with a shop, slaughter house, and places for singeing the pigs, large bowls for rendering the lard, salting and drying rooms, and lard rooms, with wooden bins, for containing the rendered fat, which is an article of great consumption in Spanish cookery, being used as a substitute for butter; there is also a soap manufactory, in which the offal fat is manufactured, and apartments where the blood is made into a kind of black-pudding, and sold to the poor. Behind all these are the sties for the hogs, generally from 800 to 1000, which occupy a considerable range of well-built sheds, about 30 feet deep, with the roofs descending very low, and having the entrance through low arches, before which is an open space the whole length of the yard, and

about 24 feet wide, in the centre of which is a kind of aqueduct, built of stone, and filled with clean water supplied from a well at the end of the premises. The hogs can only put their noses into the water, which prevents them dirtying it, as it passes through the whole division of the yard. This is the only liquid given them, and their food is maize or Indian corn, slightly moistened, and scattered at stated hours on the ground, which in the yard as well as the place where they sleep is perfectly dry and clean; they are attended by several Indians with every possible care, and have a cold bath on the premises, which they are frequently obliged to use, as cleanliness is considered essential to their acquiring that enormous load of fat from which the principal profit is derived. Their ease and comfort also seem to be studiously attended to, and the occupation of two Indian lads will cause a smile on the countenances of my musical readers, when they are informed that they are employed from morning till night in settling any disputes or little bickerings that may arise among the happy inhabitants of this community, either in respect to rank or condition, and in singing them to sleep. The boys are chosen for the strength of their lungs, and their taste and judgment in delighting the ears and lulling the senses of this amiable harmonic society, and succeed each other in chanting during the whole day, to the great delight and gratification of the audience, who seem fully to appreciate the merits of the performers.

"The proprietor of one of these establishments himself attended us, and explained with much complaisance the use of the various apartments. He assured me that the premises cost him 600,000 dollars, and that his sales before the revolution amounted to about 2000 dollars per week, indeed his display of diamonds, and his three splendid carriages with fine horses standing in the yard, bespoke him a man of some opulence and importance. His stock is bred at a hacienda or farm belonging to him near Otumba, and driven to Mexico to be fattened, when about eight months old. The breed is said to have been brought originally from the Philippine Islands."

We learn also that at Parma, in Mexico, the best hams and sausages are cured; several manufactories of them were observed by Mr. Bullock, who states the breed of hogs to be very fine.

The same writer notices a singular purpose to which the skin of the hog is applied in Mexico. "Of coopers (he says) I saw none; the skins of hogs, blown up like bladders, being substituted for barrels, and sold through the streets by itinerant venders, whose light load, supported on the end of a long pole, occupies as much space as a loaded cart."

It has, as we have already stated, been asserted

that the pigs of Brazil are descendants of the *Porc de Guinée*. We cannot admit this to the full extent. The horses and the horned cattle of Brazil are of Spanish origin, and so, no doubt, are the pigs. Nevertheless, when we consider that, for many a long year, slaves from that part of Africa have been regularly imported into Brazil, it is not unreasonable to suppose that great numbers of Guinea hogs have also found their way thither on the decks of the slave ships. At first, perhaps, they would be shipped as provision for the crew—afterwards, their good qualities being appreciated, as stock to be sold or presented to the holders of sugar plantations or other lands. In this way we may easily account for the introduction of the *Porc de Guinée* into Brazil, and the consequent modification of the European stock. Desmarest, indeed, does not say that it is the sole origin of the Brazilian race of pigs, but that it has been carried into Brazil. Whether the Guinea hog be indigenous in that part of Africa, or itself an introduction there, we cannot tell. If the domestic hog, wherever found, whether in China, Assam, Ceylon, the Philippines, the South Sea Islands, and Guinea, be specifically identical, as most contend, with our ordinary domestic race of Europe, we can only regard its wide dispersion with amazement; nor, indeed, can we conceive the mode in which this dispersion has been effected. However, other problems are equally difficult of solution. The spread of a Malay race over the South Sea Islands is one; yet, though the same race occupies New Zealand, the hog was not found there when first visited by Europeans. And again, from whatever source America, whether North or South, was peopled, the hog was not brought by the ancient colonizers; indeed, no domestic animal appears to have accompanied them, for the dogs are of peculiar kinds, and evidently the semi-reclaimed offspring of indigenous species of the genus *canis*, although they interbred with the dogs of Europe. We must not, however, wander from our subject.

Swine are largely kept in the Pampas, and, according to Captain Head, are on some occasions rather roughly treated, it being found more convenient to drag them from place to place by means of the lasso, than to drive them to their destination. During his return from witnessing the wholesale slaughter of oxen in a corral near Buenos Ayres—a strange scene of brutal confusion—the following incident occurred:—

"I saw," says Captain Head, "a man on foot select a very large pig from a herd, and, throwing a lasso over his neck, he pulled it with all his strength, but the pig had no idea of obeying the summons. In an instant a little child rode up, and very quietly taking the end of the lasso from the man, he lifted up the sheep-skin which covered

the saddle, fixed the lasso to the ring which is there made for it, and then instantly set off at a gallop. Never did any one see an obstinate animal so completely conquered. With his tail pointing down to the ground, hanging back, and with his four feet all scratching the ground like the teeth of a harrow, he followed the boy evidently against his will; and the sight was so strange that I instantly galloped by the side of the pig to watch his countenance. He was as obstinate as ever till the lasso choked him, and then he fainted, and fell on his side. The boy dragged him at a gallop more than three-quarters of a mile, over hard rough ground, and at last suddenly stopped, and, jumping off his horse, began to unloose the lasso. 'Está muerto,' (he is dead), said I to the boy, really sorry for the pig's fate. 'Stá vivo!' exclaimed the child, as he vaulted on his horse and galloped away. I watched the pig for some time, when, to my great

surprise, he began to kick his hind leg. He then opened his mouth, and at last his eyes; and after he had looked about him, a little like Clarence after his dream, he got up, and very leisurely walked to a herd of ten or twelve pigs, of about the same size as himself, who were about twenty yards off. I slowly followed him, and when I came to the herd, I saw that, from the same cause, they had every one of them bloody noses."

The pigs of this country are numerous in the vicinity of the slaughter-corral, and conjoin with foul-feeding birds in obliterating all traces of the frequent, perhaps daily, slaughter of some scores of cattle. In due time the pigs themselves fall under the knife of the gaucho. The large pigs seen by Captain Head, and so unceremoniously dragged from the common herd, were evidently intended for slaughter. Their flesh is consumed in the towns, for the gaucho eats little except the flesh of cattle.

CHAPTER IV.

ON THE PRINCIPAL BREEDS OF PIGS IN THE BRITISH ISLANDS.

FROM our sketch of the most remarkable varieties into which the pig has ramified in other countries, we may now return to a scrutiny of the breeds of our own islands.

The improvement in our breeds of domestic swine during the last few years has been very decided. And not only so; the general system of crossing now pursued tends to the establishment of a uniform race throughout every county, that is, a race presenting the same outstanding characteristics. Changes are rapidly taking place, and the fear is, that the improvements may be carried so far as to result in the formation of a stock of animals smaller in size than comports with utility, and delicate in constitution. We say there is a fear of this; at the same time, we well know that the farmer will not lose sight of his own interests. It cannot be denied that our breeds, for ages occupiers of the land once tenanted by their wild and fierce progenitors, needed great alteration. They were large, coarse, unthrifty animals, with a long broad snout, large flapping ears, low in the shoulders, long in the back, flat-sided, long in the limbs, and large boned, with a thick hide covered with coarse bristles. Their colour was generally white or yellowish, sometimes more or less spotted with black. They were enormous feeders but slow fatteners, consuming more food than was repaid by their flesh. At the same time the females were peculiarly fertile, and this is almost the only thing that can be said in their praise:

Such, then, was the old coarse uncouth breed spread, with trifling degrees of difference, over the greater part of England. In the northern counties, and especially in the north of Scotland, a smaller race, with sharp and almost erect ears, greatly resembling the wild boar in form, long existed, and is yet extant. These animals were dusky or brownish-black, wild in their habits, and very hardy. We say *were*, but, in fact, such is still the race in the Orkneys and Hebrides. They are small, rough, semi-wild beasts, depending principally upon their own means of gaining a subsistence, and are evidently the descendants of a wild stock. Their degeneracy in size may be attributed to climate and deficiency of nutrition while young; for when brought into more southern districts, and fed in the ordinary way, they rapidly acquire an increase in size, fatten kindly, and return excellent meat.

Sir Walter Scott, in his *Journal of a Voyage to the Shetland and Orkney Isles (Lockhart's Life)*, observes that the hogs of these islands "are an excellent breed—queer-looking wild creatures, with heads like wild boars, but making capital bacon."

While young these pigs often fall a victim to the eagle, which pounces upon them, and carries them off to its eyrie; indeed it is asserted that children are not altogether safe. Speaking of Hoy, one of the Orkneys, Sir Walter Scott, in his *Diary*, makes the following observations:—"The eagle, with every other ravenous bird, abounds

among the inaccessible precipices of Hoy, which afford them shelter, while the moors abounding with grouse, and the small uninhabited islands and holms, where sheep and lambs are necessarily left unwatched, as well as the all-sustaining ocean, give these birds of prey the means of support. The clergyman told us that a man was lately alive in one of the islands, who, when an infant, was transported thence by an eagle, over a broad sound or arm of the sea, to the bird's nest in Hoy. Pursuit being instantly made, and the eagle's nest being known, the infant was found there playing with the young eaglets. A more ludicrous instance of transportation he himself witnessed. Walking in the fields he heard the squeaking of a pig for some time without being able to discern whence it proceeded, until, looking up, he beheld the unfortunate grunter in the talons of an eagle, who soared away with him towards the summit of Hoy. From this it may be conjectured that the island is very thinly inhabited. In fact we only saw two or three little wigwags."

It is, as we have said, from these shaggy uncouth animals that the islanders obtain the bristles which they intertwine into the ropes made purposely for lowering the cragsmen down the face of the most awful precipices.*

These mountain hogs are in tolerable condition after their summer fare, and should be killed in autumn. Occasionally they make inroads upon the patches of corn, and commit much mischief, rooting up excavations, says Low, large enough to bury half a dozen of them, which excavations standing full of water all the winter, do vast hurt to the grounds, though the farmers stiffly maintain the contrary. During the long and rigorous winter these animals must suffer extremely, and in some islands many probably perish.

It seems that this breed, which not a century since was common in the highlands, where vast herds were kept for the sake of sale in the lowlands, is less thoroughly reclaimed than were the old gaunt flap-eared breeds of England. The latter had undergone a certain degree of modifi-

cation long before the improvements effected in modern days. Among these old breeds was one described by Mr. George Culley; it prevailed in Yorkshire and Lancashire, the animals were of large size and white, with huge ears hanging over their eyes. "They were very plain thin awkward hogs, with very long legs; but what distinguished them most was two wattles or dugs, not unlike the teats of a cow's udder, which hung down from their throats, one on each side." This breed appears to be altogether extinct in our island.

It is not often that we now hear of hogs of enormous size being slaughtered; formerly such overgrown monsters were not uncommon. The old Berkshire breed, which in its improved state still belongs to the class of large swine, not unfrequently produced huge specimens. The surprising weight that some of these hogs have been fed to, would be altogether incredible, if we had it not so well attested. Mr. Young, in one of his *Tours*, gives an account of a hog in Berkshire, which was fed to 81 stones some odd pounds; but a still more extraordinary pig was, some years since, killed in Cheshire, which might have justly been regarded as one of the monster curiosities of the day. We transcribe the details as given by Mr. Culley. His words are:—"On Monday, the 24th of January, 1774, a pig (fed by Mr. Joseph Lawton of Cheshire) was killed, which measured from the end of the nose to the end of the tail 3 yards 8 inches; and in height 4 feet 5½ inches; it weighed 12 cwt. 2 qrs. and 10 lbs. when alive; when killed and dressed, it weighed 10 cwt. 3 qrs. and 11 lbs. *avirdupois*. This pig was killed by James Washington, butcher in Congleton in Cheshire."—*Culley on Live Stock*.

In the month of December, 1846, a large hog in the possession of a relative residing at Buxton was slaughtered. It was of a white colour, and two years and two months old. Its height was 3 feet 9 inches, the carcase when dressed weighed 33 score pounds, exclusive of rough fat to the amount of 7 stones (14 lbs to the stone). It was fattened upon Indian meal, pea-meal, &c. It was, we believe, of the improved old Cheshire breed.

In the *Picturesque Promenade round Dorking* (1822) we are informed that at the Wheatsheaf (a neat public house) in that town, the mounted skin of an immense hog may be seen. The animal, which broke one of its legs by accident, was killed in an unfattened condition; its skin was dressed with the hair on, and is preserved stuffed, standing in full proportion. It exceeded in size the famous Northumberland hog of the year 1543; it weighed 104 stones, its length 12 feet, girth 8 feet, height 18 hands. It is computed that if the animal had been fattened proportionally, it would have weighed

* This cord is not always safe. "There is yet, (says Sir Walter Scott) a man living—if he can be called so—to whom the following story belongs. He was engaged in catching sea-fowl upon one of the cliffs (of the Shetland Isles) with his father and brother. All three were suspended by a cord, according to custom, and overhanging the ocean at the height of some hundred feet. This man being the uppermost on the cord, observed that it was giving way, as unable to support their united weight. He called out to his brother, who was next to him, 'Cut away a nail below Willie,' meaning he should cut the rope beneath, and let his father drop. Willie refused, and bid him cut himself if he pleased. He did so, and his brother and father were precipitated into the sea. He never thought of concealing or denying the adventure in all its parts." So true it is that habitual exposure to danger hardens the heart against its consequences, both as they respect ourselves, and others. Doubtless the man reasoned thus: it is better that two lives out of the three should be lost, than all three. I am the uppermost, those below must go; had I been below, it would have been my case. The mischance is sad, but it cannot be avoided.

nearly 200 stones. So far says our authority, but we suspect the skin, as is often the case, to have been greatly stretched in curing; the height of 18 hands is out of all bounds, and indeed the length stated, viz. 12 feet, is almost incredible.

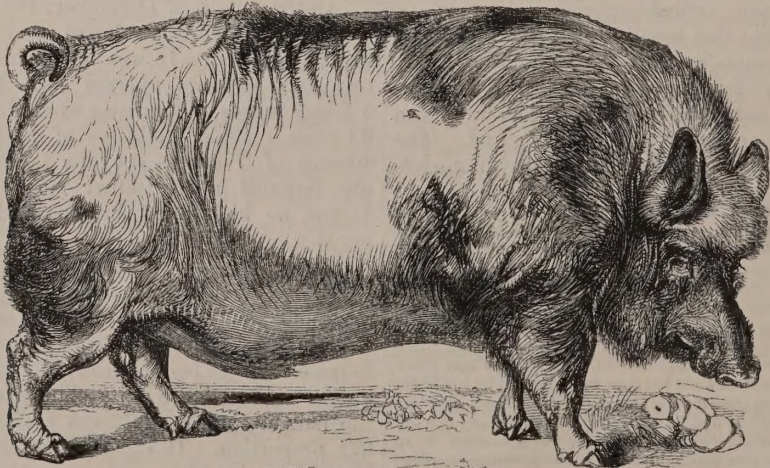
In taking a survey of our improved breeds, we can do little more than generalize, although a few breeds may require a somewhat particular notice; we mean those to which other strains owe their improvement.

Among the early improvers of the domestic swine must be enumerated Mr. Bakewell, the great founder of the new Leicester sheep. Before his time the Leicestershire hogs were of the same coarse ungainly kind which prevailed generally throughout the midland counties. He commenced as he did with the sheep, by a judicious selection of stock destined for breeding, and by persevering in this system greatly modified the characters of the old race; in due time the Bakewell breed extended into other counties, superseding or influencing the ordinary races. This was the case in Yorkshire, the old breed of which county was of large size, gaunt, greedy, and unthrifty, coarse in the quality of the meat, flat-sided, and huge-boned. By crossings with the new Leicester stock great improvement was soon effected; the cross-breed, as was to be expected, lost in size but gained in every good quality; it became deep-sided, short-limbed, small-boned, and fattened readily. The coarse wiry bristles were exchanged for fine thin hair, and the whole aspect of the animal underwent a transformation. The hogs at about two years old averaged from 30 to 55 or 60 stones of 14 lbs., younger animals weighing in proportion.

Some of the Yorkshire breeders preferred the pure new Leicesters, and these are still reared by judicious farmers, who esteem them as superior to most others, and certainly more profitable than most of the larger kinds. They fatten kindly, often attaining the weight of upwards of 30 stones of 14 lbs., at the age of sixteen or eighteen months. Other breeds, however, besides the new Leicester have found advocates in Yorkshire; among these are the Berkshire, crosses between which and the Yorkshire are deservedly esteemed, as are also crosses between the Yorkshire and Lord Western's improved Essex variety. The latter cross is remarkable for smallness of bone, rotundity of figure, and aptitude for fattening. The hogs when fat average 30 stones of 14 lbs. The Chinese and the Neapolitan pigs have been tried by several breeders, and judicious crosses between these and the Yorkshire race are excellent, both as regards good symmetry and fattening qualities. In fact, the large old Yorkshire stock may be regarded as extinct.

We must not suppose that the new Leicesters, even in their own county, have undergone no modification since the time of Mr. Bakewell. Excellent crosses have been produced between them and the Berkshire and Essex breeds.

The improved Berkshire hog belongs to the tribe of large swine, or, perhaps, rather did, for, well as we know Berkshire, we have not observed for several years any individuals approaching what may be termed an outstanding size; formerly hogs of the pure breed were often found to weigh from 100 to 110 or 120 stones of 8 lbs. to the stone; and it is recorded that one bred at Petworth in



THE IMPROVED BERKSHIRE HOG.

Sussex, measured 7 feet 7 inches from the tip of the snout to the root of the tail, 7 feet 10 inches in girth round the centre, 5 feet round the neck, and 2 feet across the span of the back. Height 3 feet 9 inches. It was remarkable that this huge animal was a moderate consumer of food; his allowance being about two bushels and six gallons of ground oats, peas, and barley, per week.

The present Berkshire breed, as we see them, are moderate sized beasts, roundly made, short in the limb, and with a short arched neck, with heavy cheeks, sharp ears, an abruptly rising forehead, short in the snout, well barrelled, broad backed, and clean in the limbs; some are sandy coloured or whitish, spotted with black, but most that we have seen lately have been either white or black, or half white and half black, a colouring indicative of a mixture of the Neapolitan and the Chinese, as well as of the Suffolk strain.

In visiting the various farms, by way of observation, within ten miles of Reading, we could generally tell the cross or crosses of the animals in the farmer's straw-yard; in many instances the breed was a compound of old improved Berkshire, improved Suffolk, and Chinese. On more than one occasion have we paused to admire the symmetry of some of these pigs; it was perfection, but certainly accompanied by loss of weight and size, compared with the older breeds; but this is of little consequence, for we believe that rather small (not too small) and quickly fattening breeds are, from first to last, the most profitable; indisputably they afford the best meat in whatever way it is prepared.

The new breeds now to be seen in Berkshire are but thinly clothed, and are said to be somewhat tender, a circumstance in that sunny county of little consequence, for the farmer's straw-yard supplies abundant shelter and comfort.

Around Henley in Oxfordshire, on the banks of the Thames, and about Dorking in Surrey, cross breeds of the Berkshire strain prevail; although in the latter country the improved Essex breed is held in great estimation. Of this latter we shall speak hereafter.

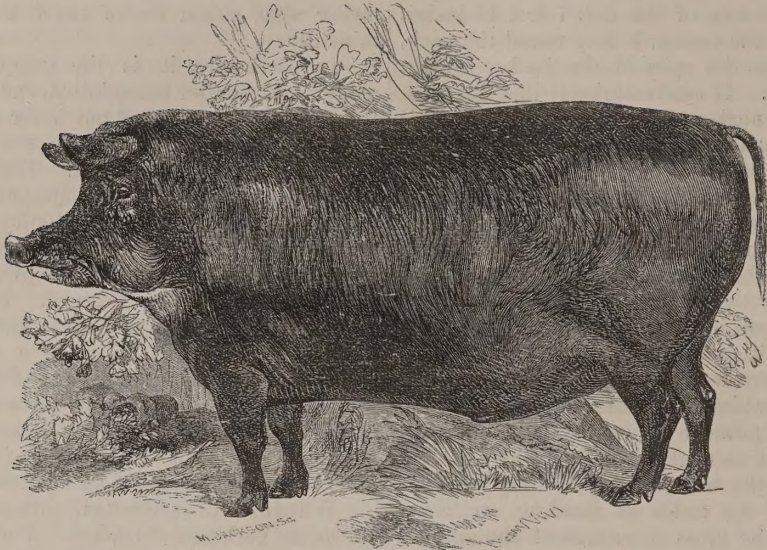
There are few counties in England into which the Berkshire breed of pigs has not penetrated; it is everywhere valued for its excellent qualities, its fair moderate size, its small bones, its thin sward of skin, its fattening qualities, and the excellence of its flesh. First rate hogs of this breed have been reared in distant counties, and Staffordshire can boast a strain from the progeny of the *Tamworth Boar*. Through Middlesex, Hertfordshire, Bedfordshire, and Leicestershire, the Berkshire breed has extended itself, modifying the old races, not without other crossings; indeed it must be confessed that the modern system of interbreeding renders it difficult to tell the original

stock on which the grafts have been made; or rather what strain shows itself the most prominently.

In Berkshire it is the general custom to singe the hogs after being killed, and not to remove the bristles by means of hot water and scraping, nor do they as a rule smoke the flitches after salting, but merely dry them. The same remark applies more or less to the adjacent counties; for example, the bacon sold in Henley is unsmoked. In fact the taste for smoked bacon and hams seems to a certain degree to be confined to London, as far as England is concerned. In Derbyshire, Cheshire, Lancashire, and some of the neighbouring counties, smoked bacon is a rarity, and on leaving that part of the country for London, the difference with regard to the flavour of this article of the table forcibly struck us; however, the *porky* or the *smokey* flavour is a matter of taste; but the empyreumatic essence of tar! *procul absit!*

Wiltshire is celebrated, and deservedly, for bacon, as Yorkshire for hams. The old Wiltshire hog was of large size, short limbed, but heavily boned, long in the body, but round and high on the croup. The ears, though large, were pointed. These animals were slow feeders, and great consumers of food; nevertheless, when, at some cost, they were fattened, they produced meat of excellent quality, especially fitted for converting into bacon. They were probably a mere variety of the Berkshire strain, and certainly possessed good qualities; but they are greatly improved, owing to judicious crossings with the Chinese and Neapolitan stocks, and though, as might be anticipated, they are smaller in stature than formerly, they are finer boned, more compact in contour, far quicker fatteners, and consequently ready for the butcher earlier. At the same time, the superior quality of the meat has suffered no decline, indeed quite the contrary. Wiltshire bacon commands a high price.

He who travels through Hampshire, and looks into the farm-yards, will see some excellent hogs, generally black, and middle sized, with rather a long snout, but compactly made; they are a modification of the old large-sized Hampshire stock, individuals of which in former days were of huge magnitude—and some carried about for show. This colossal breed is now seldom to be seen, but it had its good points; when fattened (and time and much food were required to effect this), it returned, by way of repayment, a weighty carcase. As in all such cases, however, the question comes in, was it profitable—was the repayment for food and time in a just ratio? The answer must be, quick fattening, even with a smaller carcase, a gain of time and of provision being included, is one of the points in which the farmer finds himself the best remunerated. Slow feeders, however



THE IMPROVED HAMPSHIRE HOG.

weighty their carcase at last, will not be found profitable when all expenses are calculated. As we have said, however, this old breed is seldom if ever to be seen; occasionally perhaps large sized hogs, in which the strain of the old race prevails, may be met with, but not generally. The present Hampshire hog is compounded of the old race, and the Essex, the Chinese, and the Neapolitan, with an admixture also of the improved Berkshire.

We have already stated that a semi-wild breed of pigs are peculiar to the New Forest; they are termed Forest pigs, and differ materially from the ordinary stock cultivated by the Hampshire farmers. Though far inferior in size to the true wild hog, these animals exhibit much of the characteristics of that animal, and probably owe their origin to a cross between the wild hogs introduced into the forest by Charles I. and some of the ordinary breeds of his period. These animals are heavy in the fore quarters, but light and meagre posteriorly; the withers are high, the ears short, the mane thick and bristly, the colour black or brindled; the disposition is fierce and distrustful, and they display extraordinary activity and acuteness. The troops are headed by leaders which take alarm at the slightest appearance of danger, and are ready on an emergency to act on the defensive. This forest breed, however, is now rarely to be seen in its purity—in fact, it is passing away, or perhaps rather merging into a more domestic and mingled stock, thereby losing its pristine characteristics. We have previously alluded to Gilpin's *Forest Scenery*; from the same

work we make the following quotation, relative to the semi-wild forest breed as it existed in his time; * it exhibits a striking picture of the woodland swine, half reclaimed, with which we may suppose our great forests were formerly replete.

"We well remember (he writes) an occasion when we had thrown ourselves down at the foot of a great beech tree, whence we looked abroad, from under its wide canopy of foliage, on a small track of sunshine, which, penetrating an opening in the wood, and falling athwart the ground beyond, gave a broader and deeper effect to the surrounding shadows. There was not a breath of air, and not a sound was audible. Calmly we lay in that listlessness of a dreamy musing, which to an idle mind might seem like idleness, but which the philosopher, student, or moralist knows better how to appreciate.

"Suddenly a sound like that of warlike music, mellowed by distance, came upon our ears. We started so far up from our recumbent position as to lean upon one arm and listen intently, and not without some degree of awe, being almost persuaded that some wondrous fairy pageant was about to gratify our sight.

"The sound increased and grew harsher as it advanced, and as it drew nearer—yet nearer—the tramp of what might have been imagined to be elfin chivalry accompanied it. At length, while we were yet listening in mute expectation, the

* The Rev. William Gilpin was born 1724, and died 1804. He was vicar of Boldre, on the borders of the New Forest, during the latter part of his life; and was eminent for piety, learning, and a most cultivated taste. His works are numerous. See his life in *Penny Cyclopædia*.

leading boar of a large herd of forest pigs came grunting into view, followed by all the musical members of his harmonious detachment.

"Whether it was the cheering invigorating effects of the sunshine, or whether there was something particularly savoury in the herbage of that spot, we know not, but the grunting swelled into a loud chorus, their snouts became more and more busy, their ears and tails kept up one continuous and joyous motion, and their small eyes seemed to flash back the sun's rays with unwonted eagerness of expression. It was really an interesting sight, and were it not that swine were the subject of it, we should—and truly—say it was as beautiful as interesting. The creatures were in fine condition, their bristles glittered like silver, their bodies were as clean as if they were as regularly washed and combed as a lady's lap-dog, and they seemed so full of freedom and happiness that, while looking on them, we felt all the romance of forest life, and recollections of the merry greenwood.

"Wishing to observe and admire them more closely, we sprang up, but, in so doing, alarmed them, and off they galloped helter-skelter, *saute qui peut*, with a speed that none of the porcine race, not forest born and bred, could equal, and long after every one was out of sight—vanished in the mazes of the woodland—we still heard their retreating trumpets, gradually dying away until lost in the distance."

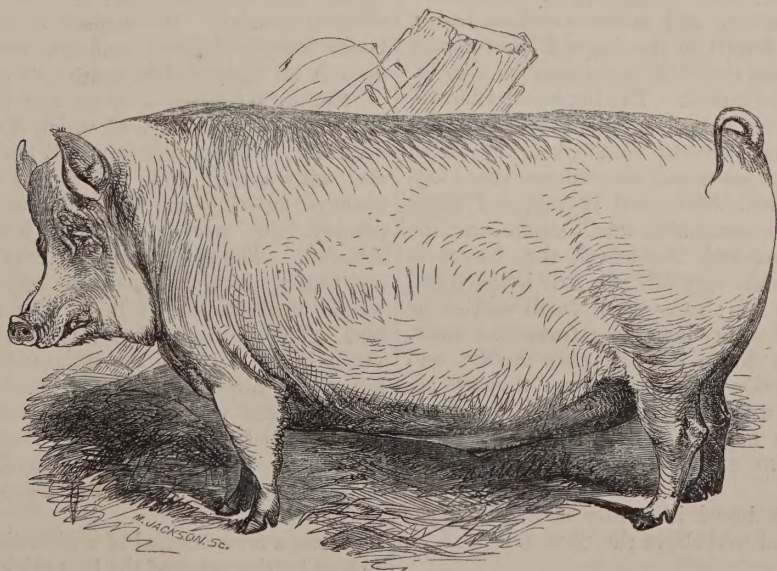
Few such truly independent herds now exist, but the forest breed has not lost its original characters.

Lincolnshire is one of the counties noted for an excellent breed of pigs. The old race were

gaunt, slow-feeding, unprofitable animals, with heavy heads and flat sides; but the improved breed of the present day are well formed, of moderate size, easily fattened, and produce excellent flesh; they are white, with fine skins, and sparingly covered with bristles, which are slender; the ears are erect and pointed, the body long, straight, and round. These pigs, deservedly esteemed, may be fatted to about 45 stones (14 lbs), and, when at the age of a year and a-half, many are found to range between 20 and 30 stones. A cross between the Lincoln and Chinese breed—though of diminished size—is found to attain more rapidly to maturity than the pure Lincoln, and fattens quickly upon a very moderate allowance of food.

Norfolk produces excellent pigs, somewhat smaller than those of Lincolnshire, but closely agreeing with them in characters; they are well-formed, fatten quickly, and yield fine meat. Besides this breed, a smaller race prevails in many parts of Norfolk, descended as it would appear from the Chinese, which it greatly resembles. These pigs are in great estimation; they fatten readily on a small quantity of food, and their flesh is delicate.

Suffolk, now noted for its improved breed, formerly possessed only a coarse, lank, thriftless stock; but this has given place to a mixed race, admirable for symmetry and quick and early fattening. The most generally approved breed is a cross between the Suffolk, Berkshire, and Chinese. These animals are rather small, but compact, short-legged, and small-headed, the body is round, and they fatten readily. At the age of a year, or



THE IMPROVED SUFFOLK HOG.



THE IMPROVED ESSEX HOG.

a year and a-half, many are found to weigh from 12 to 15 score, and produce first-rate bacon. The flesh of the sucking-pigs and of the porkers is esteemed for its peculiar delicacy.

Besides this breed, which stands first, there is an excellent cross between the Suffolk and Lincoln; the pigs attain to a considerable weight, ranging from 30 to 40 stones (14 lbs.) and upwards; they are hardy, and fatten readily. Another breed is between the Berkshire and Suffolk, and this has its admirers; it is easily kept in good condition, fattens quickly, and makes excellent bacon. It is, however, longer in the leg and less compact in symmetry than the tri-cross between the Suffolk, Berkshire, and Chinese. The improved Lincolnshire race is much valued in Suffolk, as is also the improved Essex breed, established by Lord Western,* and esteemed throughout the kingdom. It is black, short-nosed, deep-jowled, short and thick in the neck, with small, sharp ears; the limbs are short and fine-boned, the barrel is rounded, the hams very full, the hair is spare and short, the skin fine; some have small wattles or appendages of skin depending from the neck. These animals fatten quickly, grow rapidly, and yield very superior meat; as porkers they are admirable, the meat being small and peculiarly delicate. The hogs, when fattened, will sometimes weigh 26 or 28 stones (14 lbs.), often 18 or 20.

This black breed is greatly crossed with the Neapolitan, and we believe the Sussex.

* Essex produces excellent pigs; of these the most noted is Lord Western's improved breed, which is first-rate.

A modification of this breed is often seen in Essex; the pigs, like the Sussex, are generally black and white—the head and hinder parts being black, and the central portion of the body white. They are admirable in contour, with a deep round carcase, and fine skin, fine in the bone, and full in the hind quarters. The flesh is excellent. The sows produce large litters, but are said not to make the best nurses. We did not, however, hear this complaint from any of the Essex farmers, during our frequent visits to Rochford and the adjacent country. We suspect, however, that the Essex breed is delicate, and requires care, as indeed do all high-bred domestic quadrupeds.

Sussex possesses a breed very much like the last parti-coloured race, of which it appears to be a variety. These pigs are well-made, of middle size, with a thin skin, and scanty bristles; the snout is tapering and fine, the ears upright and pointed, the jowl deep, the body compactly rounded. These pigs arrive early at maturity, and fatten quickly; the bacon hogs averaging a weight of 20 stones (14 lbs.). The flesh is excellent. Their bone, perhaps, is larger than in the Essex breed, but then the improved stocks of this latter race are remarkable for smallness of bone, and we doubt whether they are more bony than the improved stocks of the old Berkshire strain. The breed is undoubtedly valuable, and well adapted for crossing with the Essex, Neapolitan, or Chinese.

Sussex once boasted of a gigantic race of pigs, known by the name of the Rudgwick breed (Rudgwick is a village in that county), some of which

were among the largest swine ever reared in our island. As is the case with all huge breeds, these animals were slow feeders, and, we may add, "huge feeders;" but they yielded an enormous weight of excellent meat. Nevertheless, they saw the day of their decline and fall; they became more and more influenced by the intercrossings of new breeds, till at length the old stock has become obsolete, its celebrity depending upon records and notices of the last century.

Bedfordshire has sent some admirable pigs to the great cattle-shows in London. Nevertheless, the animals could not be called truly Bedfordshire as to peculiarity of breed. They were crosses of various kinds, in which, as it appeared to us, the Suffolk strain was prevalent.

We do not intend to pass in review over every county in our island, because we should only have to repeat what we have already said. Crossings and intercrossings are everywhere taking place, and all the old stocks have become so altered, that the porcine race of England is generally assuming an approach to universal uniformity. The modified New Leicesters and Yorkshires, the improved Berkshires, the Essex, and the New Suffolks, with various intermixtures of the Chinese and the Neapolitan races, are everywhere extending themselves. The gaunt, lanky, old breeds, flat in the sides and heavy in the bone, are now rare spectacles, and regarded as curiosities.

Among this diversity of intercrossings, certain strains are brought to high perfection by the breeder's skill and patience, and are deemed the highest even of the race to which they may belong. Thus, for example, in Berkshire we have the Coleshill strain, the pure Wadley strain, and the old Crutchfield strain; in Essex we have Lord Western's strain; and the same observations apply to other counties. We have before us the catalogues of the cattle-shows of London for the Christmas of 1846 and 1847, both of which we attended with the express purpose of examining the stock. A few extracts will serve to show the class of pigs on which the judges set the highest value; at the same time, we are free to confess that in all cases our judgment did not quite coincide with that of the gentlemen in question, and we thought that too often exorbitant overloading of fat was too much regarded—a point of less consequence than contour, fertility, and aptitude to fatten upon moderate rations; inasmuch as the wealthy have at their command the means of forcing animals, we may say, unnaturally, and think little of the waste thereby incurred in order to accomplish their object. We have seen pigs not only incapable of standing, but also of seeing, from the enormous volumes of fat with which they were loaded. Such an accumulation of fat is in itself a disease. Think what must be the state of the

heart, the condition of the circulation, and the character of the muscular fibres. We have heard of mice burrowing in the fat of such animals, without appearing to occasion any pain or inconvenience. However, this is not the point in question.

In the year 1846, the prize and commended pigs, together with the names of the exhibitors, were as follows:—

"PIGS OF ANY BREED ABOVE THIRTEEN, AND NOT EXCEEDING TWENTY-SIX WEEKS OLD.

"225. Mr. W. Mills Barber, of Uxbridge, Middlesex—A pen of 13 weeks and 4 days old *Middlesex* improved pigs, bred by himself, and fed on toppings, barley and peas ground, and chat potatoes—*Highly commended*.

"227. Mr. Charles Eley, jun., of Heathfield Farm, near Hounslow, Middlesex—A pen of three 20 weeks and 5 days old improved *Berkshire* pigs, bred by himself from the stock of Mr. C. Eley, sen., and fed on buck-wheat, barley-meal, peas, and milk with water—*First Prize, £10, and Silver Medal to the breeder*.

"228. Mr. John Heray, of Hawthorn Hill, near Maidenhead, Berks—A pen of three 23 weeks and 5 days old improved *Essex* pigs, bred by himself, from stock bought of Mr. W. Fisher Hobbs, and fed on Indian corn, barley, buck-wheat meal, and skimmed milk—*Commended*.

"232. The Right Hon. the Earl of Radnor, of Coleshill, near Farringdon, Berks—A pen of three 21 weeks and 1 day old *Coleshill* pigs, bred by his Lordship, and fed on 20 bushels of barley-meal and 3 bushels of potatoes mixed with whey.

"PIGS OF ANY BREED ABOVE TWENTY-SIX AND UNDER FIFTY-TWO WEEKS OLD.

"233. His Royal Highness Prince Albert, of Windsor Castle—A pen of three 41 weeks old *Bedfordshire* pigs, bred by his Royal Highness, and fed on corn, meal, milk, and potatoes—*Second Prize, £5*.

"238. The Right Hon. the Earl of Radnor, of Coleshill, near Farringdon, Berks—A pen of three 45 weeks and 1 day old *Coleshill* pigs, bred by his Lordship, and fed on 48 bushels of barley-meal mixed with whey, and about 6 bushels of potatoes—*First Prize, £10, and Silver Medal to the breeder, and Gold Medal for the best pen of pigs in the 17th and 18th classes*.

"239. Mr. James Singleton, of Isleworth, near Brentford, Middlesex—A pen of three 32 weeks and 5 days old *Middlesex* improved pigs, bred by Dr. John Mackinlay, of Isleworth, from the stock of Mr. James Singleton, and fed on house-wash, grains, middlings, barley-meal, toppings, boiled potatoes, and skimmed milk—*Commended*.

EXTRA STOCK.

"250. The Right Hon. the Earl of Radnor, of Coleshill, Berks—A 45 weeks and 1 day old *Coleshill* pig, bred by his Lordship, and fed on 16 bushels of barley-meal mixed with whey, and 1 bushel of potatoes—*Silver Medal*.

"253. Mr. Edward Whitfield, of Snaresbrook, near Wanstead, Essex—A 28 weeks and 9 days old *Essex and Suffolk* pig, bred by himself, and fed on middlings, barley-meal, and milk—*Highly commended*.

"1847.—PIGS OF ANY BREED ABOVE THIRTEEN AND NOT EXCEEDING TWENTY-SIX WEEKS OLD.

"186. The Right Hon. the Earl of Radnor, of Coleshill, Berks—A pen of three 24 weeks and 6 days old *Coleshill* pigs, bred by his Lordship, and fed on barley-meal, whey, and skimmed milk—*Second Prize, £5*.

"187. Mr. Edward Whitfield, of Snaresbrook, near Wanstead, Essex—A pen of three 18 weeks old *true Essex* pigs, bred by himself, from the stock of Mr. W. Fisher Hobbs, and fed on middlings, barley-meal, and milk—*First Prize, £10, Silver Medal to the breeder, and Gold Medal for the best pen of pigs in the 16th and 17th classes*.

"188. Mr. James Peto, of Heston, near Hounslow, Middlesex—A pen of three 20 weeks and 16 days old *improved Sussex* pigs,

bred by himself, and fed on meal and skimmed milk—*Highly commended.*

"189. Mr. E. G. Barnard, of Gosfield Hall, near Halstead, Essex—A pen of three 14 weeks and 3 days old *improved Essex* pigs, bred by himself, from a sow of Mr. W. Fisher Hobbs, and fed on barley-meal—*Commended.*

"PIGS OF ANY BREED ABOVE TWENTY-SIX AND UNDER FIFTY-TWO WEEKS OLD.

"191. His Royal Highness Prince Albert, of Windsor Castle—A pen of three 39 weeks and 3 days old *Bedfordshire* and *Yorkshire* pigs, bred by his Royal Highness, and fed on barley-meal, peas, and skimmed milk—*First Prize, £10, and Silver Medal to the breeder.*

"192. Mr. Edward Whitfield, of Snaresbrook, near Wanstead, Essex—A pen of three 42 weeks and 5 days old *Suffolk* and *Essex* pigs, bred by himself, and fed on middlings, barley-meal, and milk—*Second Prize, £5.*

"193. Mr. John Hayward, of Hulsewood, in the parish of Wilmington, near Dartford, Kent—A pen of three 32 weeks old *improved Watlington* pigs, bred by himself, and fed on wash from the kitchen, toppings, oatmeal, and pea-meal.—*Commended.*

"EXTRA STOCK.

"203. Mr. James Peto, of Heston, near Hounslow, Middlesex—A 21 weeks and 1 day old *improved Sussex* pig, bred by himself, and fed on meal and skimmed milk—*Silver Medal.*"

Besides the breeds specified above, the improved Buckinghamshire and various crosses are mentioned; and of these many were excellent in general contour. In fact, the whole of the stock of pigs exhibited was a sufficient evidence of the general and marked improvement which has taken place in this class of domestic animals; but we form our judgment rather from those which showed their points, were really well fed, and not fattened up till they appeared like bloated skins of lard—as destitute of definite shape or contour, as of the power of moving about. What a waste of money must the forcing of such a porcine monster occasion! The outlay would have sufficed to bring three pigs into fine and profitable condition. And what is the object? To show in how short a time a pig can be rendered a mass of fat, and upon what sort and quantity of food. The better aim would be to show how many pigs could be well fattened in a given time upon a stipulated quantity of food—what breeds fattened the most kindly, and would be found the most profitable. As for these bloated monsters, no part of the flesh is wholesome, and but little ever eatable.

In Shropshire, Gloucestershire, Cheshire, Herefordshire, Oxfordshire, and other counties, the old races of pigs have passed away, and crosses with the Berkshire, and also with the Essex and the Chinese, have taken their place. In short, the change is universal; and even in the southern parts of Scotland, where formerly but few pigs were kept, and those of an inferior sort, excellent breeds prevail, and pigs are largely reared by the farmers.

In the Channel Islands—Jersey, Guernsey, Alderney, and Sark—the pig is an important animal, pork being the staple animal food of the islanders during the winter. It is said to be very

delicate, even more so than any in England. Almost every cottager keeps a pig, and is enabled to feed it the more easily as his garden yields an abundant supply of produce. Pork sells at 4d. or 5d. per pound of 26 ozs.

The Channel Island breed, once gaunt and coarse, and of French extraction, is now greatly improved, and fattens rapidly. The pigs are kept in sties, and fed during the spring and summer months on butter-milk, bran, potatoes, cabbages, and all kinds of vegetables; in the autumn, almost exclusively upon parsnips. Bacon hogs are generally killed at about twenty months old, and average from 300 to 450 lbs. Sometimes, however, hogs attain to a much larger size; and instances have been known in which they have weighed 640 lbs., or 80 stones, Smithfield weight, exclusive of the offal.

In the Isle of Man, the native breed closely approaches that of the Orkney and Shetland Isles. The animals resemble the wild boar in miniature, and roam about at liberty; yet they fatten readily, and yield excellent meat. Within the last few years, crosses from England have been introduced, and the plan of sty-feeding has been practised; but not, as it would appear, with much success.

It is now time that we turn to Ireland, whence so much of the salted pork and bacon sold in England is exported, and where, before the lamentable failure of the potato crops, the pig was an inmate of every cabin, on friendly terms with fowls and half-naked children, and respected as "the *gentleman that pays the rent.*" Such porcine *gentlemen* are now rare tenants of a cotter's cabin; but better days, it is to be trusted, will return, when the pig and the potato plot will glad the cotter's heart.

The modern Irish pig has, within the last few years, become greatly improved. Formerly, it was a gaunt, flat-sided, large-boned, rough beast, long in the leg, sharp along the spine, long in the snout, and with huge flapping ears. It was a slow feeder, and yielded coarse meat. Latterly, the introduction of some of our best breeds, with which to cross the old Irish swine, has been attended with decided success, although there is still room for further improvement. We have (not, however, in the years 1846 or 1847) tasted Irish bacon of very fair quality. The sides are sent, roughly salted, to certain houses in London (and other large towns), and are there finished off for the market. The greater portion of the Irish bacon lately to be seen in the shops was very ill-fed, lean, and coarse; and the sides were rolled up, the better to conceal the scantiness and the want of firmness of the fat. The people were, in fact, obliged to kill their half-fattened, often their half-starved, pigs, their own means of subsistence failing.

But we must not judge by the results of a national calamity. Irish bacon is not to be despised, and, as we have said, the breed of pigs is generally much improved. Berkshire, Suffolk, Yorkshire, and even Chinese boars and sows, have been introduced, and, by intercrossings, produced a considerable change—a change, however, neither quite so decided nor quite so general as is desirable. Besides, the plan of fattening upon potatoes is not calculated to do justice to the most improved stocks. It is true that the Irish cottier treats the pig as one of his own family; but then, his own family are fed also upon potatoes—would that another order of things was established!

The following observations, which may well bear repetition, appeared in the *Penny Magazine*, 1843, before the late failure of the staple crop, potatoes—a failure which crushed the cottier, and even blighted the prospects of the middling farmers:—"Ireland should be, one would think, a sort of paradise for pigs; for there the useful animal is treated with a degree of respect unknown to his brethren in England, though here his creature-comforts may be greater; but then his English owner looks rather to his own table as the animal's final destination, while the more disinterested Irish proprietor, generally speaking, has no such sordid considerations, for seldom does a bit of the flitch find its way into his pot. English ideas of comfort are very comprehensive; and many persons, like the late Mr. Cobbett, would scarcely let their pigs lodge in a less comfortable manner than they themselves could put up with on a pinch. In Ireland, the pig is joint-tenant and fellow-lodger with the peasant, feeding almost at the same board with him, and these privileges are most cheerfully and gratefully conceded. 'Sure and doesn't he pay the rint?' is the exclamation nearly all over Ireland. The English traveller may look with distaste at the arrangement which subsists between pig and proprietor, but soon he finds that a landholder might as well be without title-deeds as the holder of a patch of land without a grunting tenant to divide the cabin with him.

"Mr Inglis, in his *Journey throughout Ireland*, remarks:—"I used to be shocked at seeing a pig's snout at a cabin door, and looked at such a spectacle as a *proof of wretchedness*; but now I began to *bless the sight*, and to pity more the wretches who possessed no pig. It is true that things were still better when a pig-sty was visible; for that gave evidence both of the existence of the pig, and of the superior comfort of its owner. But still it was always to me a pleasant sight, where, if no pig-sty was visible, I saw him that pays the 'rint' walk leisurely in and out of the cabin door, or heard his comfortable grunt within. The greatest example of individual prosperity I observed among

the poor of the neighbourhood of Thomastown, was finding three pigs resident in one cabin.'

"The Reports of the Assistant Commissioners under the Irish Poor Law Inquiry abound with facts showing the very great importance and value attached to the possession of a pig by the peasantry, and the attention which they pay him. One extract will be sufficient:—"Whatever may be the poverty and privations of the labourer and his family, the pig is almost always sure to be coddled up with a good dinner, and a snug warm corner in the cabin; and the Assistant Commissioners have more than once been puzzled to decide whether his or the children's bed was composed of the cleanest and largest quantity of straw. The great importance of this animal to the labourer and the smallest occupier (their only means in almost all cases of paying their rent), is quite sufficient to account for the care and anxiety which are evinced to promote his thriving."—(*Appendix F., Poor Inquiry*, p. 385.)

"A very large proportion of the pigs reared in Ireland find their way, either alive or cured, into the English market. Irish rents could not be paid but for English prices; and, therefore, the Irish peasant, and small or large farmer, must dispose of his live stock for exportation to England, they themselves enjoying but a small portion of the fruits of their care and labour, as the bulk is absorbed in the payment of rent. As nearly every head of a family amongst the rural population endeavours to obtain land as the surest resource against starvation, the agricultural exports must of course be very large. Between 1825 and 1835 they rose in value from £9,243,823 to £16,693,685, being an increase of £7,449,862 a-year in the short space of ten years. This has been almost entirely the effect of steam-navigation, which has wonderfully facilitated the means of access to the English market from Ireland; and, at the same time, increased the power of paying a high rent. Take pigs only, a source of rent as already shown,—in 1801 there were not two thousand imported from Ireland into all the ports of Great Britain; and, in the following years, as under:—

	1805.	1809.	1813.	1817.	1821.
Pigs imported	6,383	472	14,521	24,193	104,501.

"In 1821 steam navigation was in its infancy, but it was already beginning to tell on the export trade in live stock. In 1837 its powers had increased to such an extent that the number of pigs brought alive from Ireland into the port of Liverpool only was 595,422, of the average value of fifty shillings, making a gross sum of £1,488,555.—*Porter's Progress of the Nation*, vol. ii., p. 82. If we add the imports into Bristol, the number of pigs will probably be 700,000, and their aggregate value £1,750,000. There are no means of ascertaining the imports at the other ports of Great

Britain, as, since 1825, the trade between the two countries has been assimilated to a coasting trade, and, except for corn and grain, no official returns are required to be kept. At the same time, the export of bacon and hams from 1825 to 1835 did not decrease, but it cannot be ascertained whether the quantity of pork exported fell off, though it probably did. The export trade in pigs is very active at all the eastern ports of Ireland. It is probable that more than six-eighths of the total number received in Great Britain are imported at Liverpool. The cost of conveyance from Dublin to Liverpool is from 1s. 6d. to 4s. per head, according to size, and from Drogheda to Liverpool, from 1s. to 3s. On reaching Liverpool they are generally conveyed to Manchester by a railroad waggon, the weight carried being from 45 to 50 cwt. The weight of the pigs varies from $\frac{1}{2}$ cwt. to 2 cwt., and the charge is about 25s. per waggon between the two towns. From Manchester the animals are conveyed by railways farther into the interior. In a provincial paper the following paragraph appeared, showing that the English country dealers find it answer their purpose to attend the pig-market at Liverpool:—'Early on Tuesday morning a number of excellent bacon pigs were to be seen slaughtered in the shop of Mr. Barlow, Shamble Street, Barnsley, which were at Liverpool, above one hundred miles from that place, on Monday afternoon at five o'clock. This extraordinary piece of work was done by Mr. Thomas Fleetwood, pig-dealer, who left the Royal Oak Inn, Barnsley, at a quarter past five o'clock on Sunday afternoon, and consequently travelled upwards of two hundred miles in thirty-eight hours, and drove the pigs above six miles to and from the railway stations.'—*Doncaster Gazette*, 1843. The trade of a pork-butcher was comparatively unknown twenty years ago in many towns of large size, but it has been gradually increasing in extent and importance. It is, of course, quite a distinct calling from that of the dealer in bacon and hams.

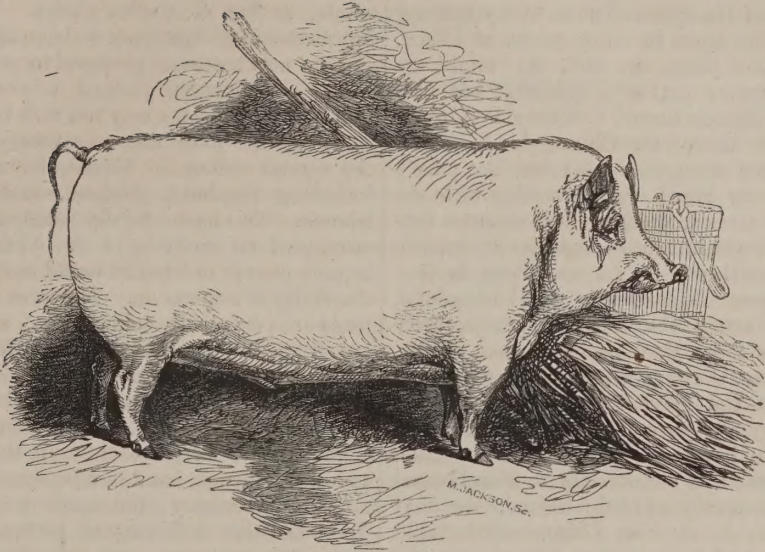
"The Irish bacon is not of such good quality as that fed in England, as the animal is generally fattened on potatoes only, while the best practice here is, when half fat, to finish off with peas-meal or barley-meal. The agricultural labourers in counties where their condition is most comfortable, know that it is most profitable to buy the higher priced English bacon, which swells in the boiling, and is at once more palatable and substantial than the potato-fed bacon of Ireland. In order to obtain the advantages of the English market, great improvements have taken place in the breed of pigs kept in Ireland. 'The breed has been quite changed within a few years, and is now excellent. The increase in the export of pigs from Ireland is more striking than that of any other article of

produce, and to that degree have the tillage farmers profited by steam navigation.'—*Lord Clement's Pamphlet on Ireland*, 1838.

"With respect to the pig-trade in Ireland itself, the amount of bargaining and dealing involved in the transfer of Irish pigs from their owners to the butcher and curer is far greater than is occasioned by the sale in a similar way of ten times the number of sheep; for, in one case, pretty nearly every pig has a separate owner, while each flock-master has a number of sheep for sale at the same time.

"The number of pig-jobbers and pig-drovers in Ireland is, of course, very large. The dealing is exactly of a description adapted to the commercial character of the Irish of a particular class. There is scope here for fun, 'blarney,' and cunning, and many a rich scene takes place before a bargain is struck. Mr. Inglis gives a specimen of the mode of proceeding in the market-place at Cashel:—'A man, a pig-dealer, would come to a countryman who held a pig by a string. How much do you ask?—Twenty-eight shillings, the answer might be. Hold out your hand, says the buyer; and the proprietor of the pig holds out his hand accordingly. The buyer places a penny in it, and then strikes it with a force that might break the back of an ox. Will ye take twenty shillings? The other shakes his head. Ask twenty-four, and see if I will give it ye, says the merchant. The owner again shakes his head. It is probable by this time that some one among the bystanders—for there is always a circle formed round a bargain-making—endeavours to accommodate matters; for it is another instance of the kindly feeling towards each other, that all around are anxious that the bargain should be concluded. Again, says the merchant, hold out your hand—and again a tremendous blow is struck, and a new offer made, till at last they come within a shilling, perhaps, of each other's terms, when the bargain is struck; and the shilling about which they differed, and probably two or three others, are spent in whisky-punch *screeching* hot.' The pigs are then most probably either driven to the shipping port, or to the large curing establishments, or sold to those who fatten and cure, but do not breed pigs."—1843.

What the state of the pig trade in Ireland at present is, and what the amount of the exports in bacon, hams, and live animals from that country into Great Britain may be, we have no means of ascertaining. Whatever decline may have recently taken place arises from a state of things in Ireland of which no one is ignorant; the potato failure has indeed proved a most calamitous event. Let us hope that plenty, tranquillity, and industry will soon renovate the condition of affairs, and that the pig once more may grace the sty, or,



THE CHINESE HOG.

if it be preferred, luxuriate in the cabin of the labourer.

In our survey of the leading improved breeds of the British Islands, the Chinese pig has been often brought under notice. We have already sufficiently described it, but as it is naturalized in our country, a few remarks upon it may not be out of place.

The Chinese pig is seldom kept in its pure state: its flesh indeed is exquisitely delicate, especially that of the sucking pigs; and, though it fattens rapidly and at little cost, yet, from the unctuous character of the fat, the sides are not calculated for making prime bacon. Besides, the Chinese pig is tender, susceptible of cold, and difficult to rear, the more so as the sows do not generally make good nurses. At the same time, as a source of improvement among our indigenous breeds by judicious intercrossings, too much cannot be said in its praise; indeed, it has been one of the most successful means of introducing reform among our old stocks; it has corrected the faults of gauntness, of heavy bones, of slow feeding, of coarse flesh, and of a dense sward. True, it has caused a reduction in size, but not in hardiness, by its intercrossing; yet what advantages have not been gained by that very practice?

Now these ideas are not quite in accordance with those of Mr. George Culley (1807), and it is but just that we allow him to speak for himself. His words are, "The Chinese or black breed will always be valuable; for, although they do not feed to any great weight, yet they fatten amazingly fast, and afford the *sweetest* bacon, which has gained the preference everywhere amongst the

nice-eating people. Indeed, to those that have not been accustomed to the very fat bacon in the southern and midland counties, the very sight of it is enough to a person with a very delicate stomach, who cannot behold the very fat part of it without almost sickening, while the people in these counties eat it at all times of the day; I have frequently seen them breakfast upon it.

"The black breed are deservedly in great esteem, and would be much more so, were they not such a mischievous race; for the most attentive herding (or tenting, as it is called in some parts of the south) can scarcely keep them from your fields of corn, peas, or potatoes: nothing will secure them except walls or good paling."

How shall we defend our opinion against so able a farmer and so good a judge? In the first place, in the year 1807 the grand movement of pig-improvement was barely commencing. Everywhere the old breeds were common, and these, when fattened by dint of labour and at great expense, were indeed huge masses of coarse fat and coarser lean. No wonder that the softer, fat-bearing, and delicately fleshed Chinese should have been greatly preferred, in the state of bacon, by "nice-eating people." But the result had yet to be accomplished, and soon—by the cross of this valuable stock—our native breeds began to assume a very different character, in fact, they became ameliorated; their bacon was no longer coarse and disgusting from its rankness, and, as the improvement in the breeds made progress, so did that of the art of curing. We now hear of Wiltshire bacon, of Yorkshire hams, of Berkshire bacon, of

Gloucestershire bacon (as we can testify of no mean quality), of Hampshire bacon, to say nothing of other counties equal in all respects, as Essex, Lincolnshire, &c. (here, in fact, we might go through the greater part of England); but who asks now for Chinese bacon? Where is it to be obtained? Is there no Chinese-bred bacon? Let this be our answer:—Yes; but not purely so. The Chinese breed, amalgamating with the old Berkshire stock and others, has so much contributed to the attainment of excellence, that, in fact, the crosses throw, as far as bacon is concerned, the pure Chinese into the background, albeit to this strain the improvement is attributable. It is more than probable that, in Mr. G. Culley's time, the pigs he called Chinese were half-bred. At the present time we can safely affirm that very few *pure* Chinese pigs are to be met with. We have seen them; but that rather from a combination of circumstances, than because they were commonly spread; indeed, we have seen specimens direct from China—comfortable, short-necked, thick-jowled, deep-bellied animals; some black, some mottled, all under-sized, but very tame, and even intelligent. What Mr. G. Culley means by the Chinese being so "*mischievous*," we cannot tell; all pigs will forage in good quarters, if liberty be given them.

Thus, then, a strain of the Chinese breed does enter into the system of the varieties most celebrated for the production of bacon; and since the days of Mr. G. Culley, if we may use a homely expression, "*the tables have been turned*." Certain it is that the pure China-bred flitch may be sought for long, and then never found, in our markets, or among our dealers in bacon.

Mr. G. Culley devotes a few lines to what he calls the Highland or Irish breed, which, he says, is "*a kind no otherwise worth naming but for distinction's sake, for I am persuaded whoever is acquainted with the Berkshire or black breeds will never throw those aside for these*." They are a small thin-formed animal, with bristles standing up from nose to tail, and exceedingly bad thrivers (no doubt upon such food as they had). We met with considerable herds of them upon the moors in different parts of the Highlands of Scotland, picking up the wild berries, especially about Thurso, in Caithness. I have seen the same kind of pigs in different parts of Ireland."

The semi-wild pig of the Highlands, and of the Orkneys and Hebrides, is a diminutive semi-wild animal, but it fattens rapidly on good and proper food, and makes excellent bacon. In some parts of Ireland—the northern districts more especially—the same race of pigs might then (1807) and may now be found (we allude to what we may truly call the Scotch province of Ulster), but such was not the ordinary huge, gaunt, flat-sided,

coarse-bristled breed of this island, taken as a whole, in Mr. G. Culley's time. To the recent improvement of this stock we have already alluded. We are not, however, prepared to say that in some districts of western Ireland a breed resembling that of the Hebrides may not still linger.

Thus far have we endeavoured to illustrate the various influential breeds of our own country, including Scotland, Ireland, and the smaller islands. To have rigidly analysed or rather attempted an analysis of the varieties peculiar to each county or district would have been folly—the thing is impossible. Mixtures and intermixtures are perpetually taking place, and individuals are from time to time establishing their own favourite crosses. In every county is this system of improvement in operation; the whole is fluctuating, yet the broad strong current bears on towards improvement. Nevertheless, in this tideway impulse, the strong hand of a judicious steersman is the more necessary: the mark may be overshot. We mean that deficiency of profitable size, weakness of constitution, and infertility, may, unless judgment in crossing be exercised, detract from the merits of an otherwise most valuable stock.

It would be interesting could we truly ascertain the amount of property invested in the United Kingdom, not only in the porcine race, but in other descriptions of live stock; all the attempts of the kind are merely approximations, yet they are not therefore valueless—they give at least general ideas on the subject, and not unfrequently surprise us.

M^rQueen, in his *Statistics of the British Empire*, has thus stated the enormous value of live stock in the United Kingdom, exclusive of domestic poultry (by-the-bye no trifle). It appears that there are 2,250,000 horses of the total value of £67,000,000, of which more than 1,500,000, are used in agriculture, and valued at £45,000,000; the value of horned cattle in the kingdom is about 14,000,000, of the value of £216,000,000; the number of sheep 50,000,000, whose value is estimated at £67,000,000. The extent of the capital invested in swine is still more extraordinary when we reflect how little it is thought upon or taken into account. The number of pigs of all ages, rearing, and breeding, is calculated to be upwards of 18,000,000, which, taking one-third at £2 each, and the remainder at 10s. each, gives a value of £18,870,000, as the capital invested in pigs alone.

This is of course only an approximation to the truth, for the stock of all our domestic quadrupeds is liable, from various circumstances, both to increase and decrease; nevertheless, the statement, with every deduction, is calculated to excite some degree of surprise. Let it be remembered that the whole of the United Kingdom is included in this estimate.

CHAPTER V.

ON THE GENERAL MANAGEMENT OF SWINE.

WE have already said something respecting the principles to be adhered to in the selection of stock intended for breeding, nevertheless we have not stated the qualities which ought to be possessed by every animal from which it is desirable to breed. To rely on the *terms* Berkshire, Essex, Suffolk, improved Yorkshire, improved Bedfordshire, &c., as guarantees of first-rate qualities, would be folly. In all counties—even those the most renowned for their breeds—there are both good and bad, and even of the best breeds some are inferior to the others, and ought to be rejected as unfit for becoming the parents of a lineage.

We have seen, though rarely, scurvy-looking animals both in Berkshire and Essex; but, setting these aside as animals from which no man in his senses would think of breeding, still the question remains, how ought he to choose, with the best stock at his selection? The following rules will apply to all breeds:—

Fertility. The strain from which the farmer or breeder selects ought to be noted for fertility. In a breeding sow this quality is essential, and it is one which is inherited. The same observation applies to other domestic animals. But besides this she should be a careful mother, and with a sufficient number of dugs for a family of twelve at a single litter. A young untried sow will generally display in her instincts those which have predominated in the race from which she has descended, and the number of the teats can be counted. Both boar and sow should be sound, healthy, and in fair but not overfat condition, and the former should be from a stock in which fertility is a characteristic.

Form. It may be that the farmer has a breed which he wishes to perpetuate; it is highly improved, and he sees no reason for immediate crossing. But, on the other hand, he may have an excellent breed, with certain defects, as too long in the limb, or too heavy in the bone. Here, we should say, the sire to be chosen, whether of a pure or cross breed, should exhibit the opposite qualities, even to an extreme, and be, withal, one of a strain noted for early and rapid fattening.

But what is meant by *form*, as applied to the pig? A development of those points connected with the profit of the owner. In these points, high or low blood is demonstrated. The head should be small, high at the forehead, short and sharp in the snout, with eyes animated and lively, and thin, sharp, upright ears; the jowl, or cheek, should be deep and full; the neck should be thick

and deep, arch gracefully from the back of the head, and merge gradually into a broad breast; the shoulders should be set well apart at the clavicular joint; the body should be deep, round, well barrelled, with an ample chest, broad loins, and a straight, flat, broad back; the tail should be slender; the hams should be round, full, and well developed; the limbs, fine-boned, with clean small joints; and with small compact hoofs, set closely together, with a straight bearing upon the ground. If in perfect health, the animal will be lively, animated, hold up his head, and move freely and nimbly. We do not speak of fat hogs, for they are necessarily sluggish and unwieldy; nor yet of pregnant sows, but of young store hogs, or of young stock selected for breeding.

Bristles. These should be fine, rather scanty, so as to show the skin smooth and glossy; coarse, wiry, rough bristles usually accompany heavy bones, large spreading hoofs, and flapping ears, and thus become one of the *indicia* of a thick-skinned and low breed.

Colour. Different breeds of high excellence have their own colours, white, black, parti-coloured black and white, sandy, mottled with large marks of black, are the most prevalent. A black skin, with short scanty bristles, and small stature, demonstrate the prevalence of the Neapolitan strain, or the black Chinese, or perhaps an admixture of both. Many prefer white; and in sucking pigs destined for the table, and for porkers, this colour has its advantages, the sward, or skin, looks more attractive; nevertheless, we think that the sward of black hogs is in general thinner than that of white hogs, and less subject to eruptive diseases.

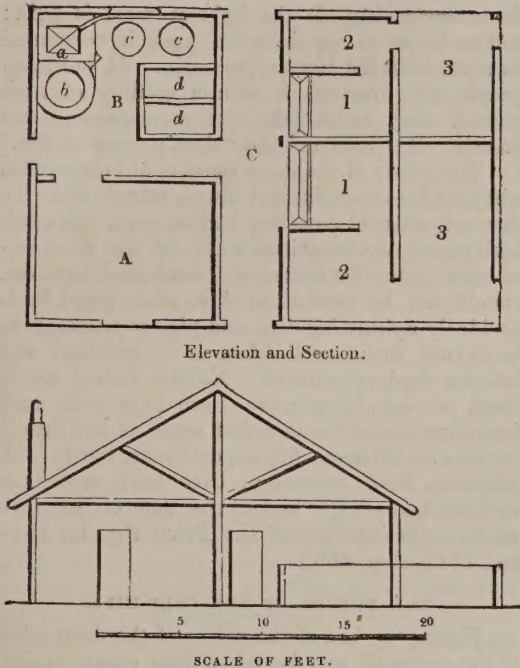
Having thus pointed out the characters of such pigs as ought to be chosen, whether for feeding or for breeding, let us next turn to the accommodation to be provided for them. Any place is thought good enough for a pig, no matter how dark, damp, or filthy it may be, and in such places we have seen pigs kept. But what has been the consequence?—Diseases of the skin, swellings of the joints, dulness, and loss of eager healthy appetite; often, after being slaughtered, the intestines are found infested by parasitic worms. So far from any place being good enough for a pig, much of the animal's health and ultimate profitableness depends on the domicile in which it is kept. For a cottager who keeps only one or two pigs, a well-built wind and waterproof sty or shed for a dormitory, in an enclosure for air

and exercise as large as convenient, will suffice. The feeding trough should be made of stone, as wooden troughs are liable to be gnawed, and are often knocked over when half full of food by the snout of the pig, either by accident or in wantonness. It would be well also to give the animal access to a stone receptacle of clean water; for though much water should not be given to a pig during the progress of fattening, still the animal should never be allowed to suffer from thirst; nothing tends more than thirst to derange the digestive organs, and prevent the animal from thriving. The floor of the whole sty and yard should be well paved with brick, and incline to a drain, both for the sake of dryness and facility of cleaning. The manure, liquid as well as more solid, should be put into a manure-pit for the future benefit of the garden. A sufficient quantity of straw should be spread on the floor of the dormitory, and all should be clean, even the trough, which should be washed out every day. The door should be made to open inwards; otherwise, if not very strongly secured, it is liable to be forced open by the animal, and much mischief may be done in the garden before any one is aware of it. Pigs are very fond of rubbing their sides and shoulders against convenient objects, and this, as it excites the circulation of the blood in the vessels of the skin, is very beneficial; hence, a short stout post driven into the ground by one of the side walls of the little yard or enclosure would be a serviceable and unexpensive addition. The sty should not be exposed to the north and easterly winds; at the same time it should be shaded from the mid-day glare of a hot summer's sun. Such a sty as we have described, a cottager may build for himself; it will cost little, excepting his own labour; his objects are the comfort of the animal, and the saving of the manure; and the latter object, in particular, is too often neglected, as is also the cleanliness of the sty altogether.

The above remarks apply more especially to the cottager, but are not quite applicable, excepting as far as principle goes, to the farmer who finds it profitable to keep many pigs, or the brewer, or distiller, or milk-merchant, upon whose establishments great numbers of these animals are kept. The farmer may find a range of simple sties similar to what we have just described to be convenient, with larger accommodations for breeding sows, and an exclusive and well-secured domicile for the boar. The young pigs, and porkers, with the sows, will have the advantage of a farm-yard or large straw-yard, in which they may indulge themselves according to their natural instincts. They must of course be stied up for fattening; but before this process commences they may be turned into the cut wheat fields in autumn, or into the oak copses (if there be such), not however without being under surveil-

lance. The air and the moderate exercise taken in searching for a scanty but excellent kind of food, will render their repast when driven home in the afternoon most acceptable. The farmer, however, and the brewer or milk-merchant (we mean the great milk-dealers in the neighbourhood of London), are differently situated. In the latter cases, a well-arranged series of airy cleanly sties is imperative, especially for pigs above the size of sucklings, for even in such establishments the latter may be allowed some degree of liberty. System and order should prevail. There should be a proper place in which to mix and boil the food, with one or more large coppers and straining apparatus. The food should be mixed in square brick tanks, sunk in the ground and cemented, in order that no filtration of the more fluid parts may take place. If there is only one tank there should be a partition in it. From the boiling house there should be an immediate communication with the sties, under cover if possible—but an out-house close to the sties, with a loft for roots, &c. may be made available. Each sty should open into a small yard behind, enclosed with a low wall or paling, but with a strong door. There should be separate sties for breeding sows, for porkers, and fattening hogs. Not more than three or four of the latter should be in one sty. The food should be given in troughs, in a separate compartment from that in which the hogs lie down, and no litter should be allowed there. The floor should be of brick or stone, should be frequently washed clean, and the troughs should be cleaned out before every meal. Any of the food left from the last meal should be taken out and given to the store pigs. A very convenient contrivance for keeping the troughs clean is to have a flap or door made with hinges, so that it can swing, and alternately be fastened by a bolt to the inside or outside edge of the trough. When the hogs have fed sufficiently, the door is swung back, and the trough easily cleaned out. It remains on the outer side of the door till feeding time; when the food is poured in without any impediment from the greedy hogs, who cannot get at it till the door is swung back. This simple contrivance saves a great deal of trouble, and is easily adapted to any common sty. It is a great advantage to be able to inspect the sties without going into them, and this is effected by placing them under a common roof, which may conveniently be a lean-to to the boiling house or any other building, with a passage between them. The subjoined sketches will convey a general idea of the plan.

A different arrangement is recommended by Mr. Henderson. "Have a house thirty feet by fifteen, with four doors all opening outwards, and three partition walls through the house, viz., a wall between each of the doors dividing the house



Elevation and Section.

SCALE OF FEET.

A, root-house; B, boiling and steaming house; a, steamer; b, copper; c, c, steaming-vessels; d, d, tanks to mix the food; C, passage to the sties; 1, 1, feeding-rooms; 2, 2, sleeping-rooms; 3, 3, yards.

into four compartments. The two middle ones I use for eating rooms, and the others for sleeping apartments, having an inner door between each eating and sleeping apartment. By this plan the keeper is enabled to get the eating chambers swept out, the troughs cleaned, and the food put into them, without disturbing the swine or being disturbed by them. There should be a division wall through each sleeping apartment; in the hinder part should be the litter, and the front and smaller compartment, through which the animals must pass to get to their food, may be used by them as a kind of necessary, for these animals will never defile their beds if they can avoid it.

"The following is the most convenient manger for their food. Let it be as long as the house is wide, and fixed against the middle wall, in form similar to a horse manger, but not so deep, and it must be divided into twelve divisions, by partition boards four feet in length or height, and a little broader than the manger is wide; thus a number will feed together as well and quietly as two or three. Before every meal the trough should be well washed and the place swept, and once in the day a little fresh litter placed in the sleeping chambers. Each of these sleeping and eating rooms may be temporarily divided into two should it be requisite. The sleeping rooms should be dark, as animals fatten much more rapidly when they lie down and sleep after each meal, than

when they wander about. There should be a square yard to each piggery, well paved and drained, as should the sties be also; and where it is possible an enclosure or small piece of ground adjoining is exceedingly useful.

"Those who have space to admit of it will find it advantageous to have five apartments instead of four, and in the fifth or central one to have a boiler to prepare the food, and chests or lockers to contain the various stores."

In these expensive plans we see no advantage over a range of well-built sties of the ordinary kind, of convenient size, adjoining a steaming-shed and root house or loft, and with an adjoining field or paddock for the use of the young and store pigs. Where numerous pigs are kept it will be advantageous to have a double row of sties, with a paved alley between them; there should be good drainage, by which all refuse is carried off to a manure pit, and the greatest cleanliness should be maintained. Six breeding sows, giving each two litters per annum, will produce yearly upwards of a hundred pigs; of these fifty or sixty may be fattened at the latter part of autumn, through the winter, and during the months of February and March, for bacon; the younger brood may be killed as porkers, or sold off as stores. With respect to the steaming apparatus, it will be found available for other animals on the farm, as horses, &c., to which steamed potatoes and other roots may be profitably allowed. There is no reason why it should be devoted exclusively to the pigs.

We need not repeat that the breeding sows should be kept each by itself in a large and commodious sty, and that the store and fattening pigs should have their respective tenements. Some recommend that the floor of the sleeping shed be made of planks, as bricks are cold and apt to induce cramp or diarrhœa; certainly wood is preferable to bricks, but we think that the paving of the whole sty might consist of asphalt. Where bricks are used they should be set in cement, in order that no filtration may take place through the interstices, and thereby keep the soil underneath in a state of wetness, whence noxious gases will necessarily arise and generate disease, to the great loss of the farmer. Both bricks and wood are more or less porous, but not so asphalt; the latter therefore will form a dry floor, easily cleaned, and one moreover which in common language will not "strike cold." Another thing is desirable, namely, that the roof of the sty, whether composed of slate, tiles, or slabs of stone, should have a gutter in order to carry off the rain; this may be easily contrived, and at little expense, and will often keep the sty from being flooded.

From the *piggery*, we may now turn to the *food* on which the pig is to be brought up and fattened.

THE REFUSE OF THE SLAUGHTER-HOUSE.

The hog is an *omnivorous* animal—and will even greedily devour flesh, and garbage, and butchers and even others are in the habit of feeding their pigs upon blood, entrails, offal meat, and similar matters. It is a disgusting practice, but besides this it is essentially wrong; such diet renders the animal savage and dangerous, a child accidentally straying within the reach of a hog thus fed would be by no means safe from a ferocious assault; moreover, it keeps the animal in a state of feverish excitement, and leads to inflammatory diseases.

Again as it respects the meat, it is rank, coarse, and scarcely wholesome. Pigs are often kept in knacker's yards, where they revel in corruption. What must their flesh be!

THE REFUSE OF THE KITCHEN.

The same objections do not apply to *pot-liquor* or *kitchen-refuse*, for although there is a good portion of fat, bits of meat, and skin, and the liquor in which meat has been boiled, still it has been cooked, and is mixed with the peelings of potatoes, carrots, turnips, cabbage-leaves, bread, milk, &c., &c., and forms an acceptable mess. The cottager who keeps a pig or two, often depends upon the kitchen-refuse of his richer neighbours, who may be inclined to allow him to place a "hog-tub" on their premises. Some however refuse; they allege, and not without reason, that it encourages waste in the kitchen, and not only so, it occasions the loss every now and then of a silver spoon, which is carelessly thrown into the wash with the scrapings of dishes and plates. On the other hand, it is a pity that this wash, so valuable to the cottager, should be denied, and indeed thrown away. Surely it is our bounden duty to aid the industrious poor man in his honest endeavours, and it is his duty to see that those who serve him suffer no loss. Not many weeks since a silver spoon, missing for some days, was brought back to us by a cottager who found it in the hog-tub which we allowed him to keep in our yard—a pleasing, and, we would hope, not a rare instance of integrity.

THE REFUSE OF THE DAIRY.

The *refuse of the dairy* is noted for its importance both in the fattening of porkers and bacon-hogs. The very term of "dairy-fed pork" conveys an idea of delicacy; it has a pleasant sound, we associate it with the idea of meat pleasant to look upon and delicious to the taste, and not without cause; true dairy-fed pork is indeed a luxury, it causes no indigestion, and sits easily on the stomach. Celsus says, "*Inter domesticas verò quadrupedes levissima suilla est*"—that is, among

domestic quadrupeds the lightest meat is pork; and as far as young dairy-fed pork is concerned we agree with the Roman physician. If, however, people will overload it with a stuffing of rank onions, they must take the consequence—and brandy. All have not the "*dura messorum ilia*."

The refuse of the dairy consists of butter-milk, whey, and skim-milk, and these, mixed with the flour of steamed potatoes, Indian corn, pea-meal, barley-meal, &c. constitute a diet of the most nutritious quality for fattening. Such food, however, should not be administered to store pigs; it is decidedly a *fattening* diet, and pigs accustomed to it do not thrive well when it is withheld and inferior food substituted. No one indeed would think of supplying mere store pigs with such luxurious food. On this diet some of the fattest porkers of thirteen, fifteen, or twenty weeks old, which we have ever seen, have been reared, as well as bacon-hogs under the age of fifty-two weeks.—(See the list of the Prize Pigs for 1846 and 1847, at p. 469.)

THE REFUSE OF THE CORN-MILL.

Having spoken of the refuse of the dairy, that of the *corn-mill* may be taken into consideration. The large miller, and the large dairy farmer, whether cheese or butter be his staple production, find swine a profitable stock. The very sweepings of the mill are thus made by the miller to return a profit; he may have to purchase whey, or butter-milk, or skim-milk, from the farmer, but the latter has to purchase barley-meal, &c. from the miller, or at least to pay him for grinding it.

THE REFUSE OF THE STARCH MANUFACTORY.

Among other substances available for swine is the *refuse of the starch manufactory*, that is, of the wheat-flour used in the production of this substance. We ourselves have never seen it employed; it is said to be extremely nutritious, the animals fattening on it with great rapidity, and yielding very firm and substantial bacon. At the same time it is apt to cloy the appetite, and therefore should be given alternately with food of a different quality; indeed in all cases alternation of food is highly desirable, as the stomach palls upon one exclusive kind. The best method of preserving the paste deprived of the starch is to make it up into cakes and bake it. We do not, however, here speak from our own knowledge, for we have never seen this *refuse* used. As is evident, it can only be employed locally and not generally; it is said to be far superior to the refuse grains and wash of the brewery or distillery.

THE REFUSE OF THE BREWERY AND DISTILLERY.

Pigs are usually kept in considerable numbers by the proprietors of large breweries and dis-

tilleries; nevertheless these refuse grains and wash are not well adapted for sound fattening, unless mixed or alternated with other food, as pollard, barley-meal, &c. It is true that the animals become in good apparent condition, but their fat is flabby, and does not swell on being boiled, as the fat of good bacon ought to do.

With respect to the refuse of the *distilleries*, especially the wash, it ought to be very cautiously given; if allowed too liberally, the animals reel from sheer intoxication, especially until they are accustomed to it, and we cannot but think its influence on the healthy condition of the animals to be injurious. "Neuenhahn says that the refuse of the brandy distillery cannot be given to the pigs too warm, or too soon after its removal from the still, and that it *never heats* their blood; but that if it be allowed to get cold and stale, it is rather injurious than beneficial to them. On the other hand, many experienced distillers who fatten large numbers of hogs, assure us that it requires great attention, and the employment of a man on whose care they can rely, to prevent this residue from being given to the animals while too warm, for it is then that it injures, and materially retards their growth."—YOUATT.

This wash is not a natural food; it is not one which they will at first take willingly, nor can we regard it as beneficial; the pigs may indeed become bloated, but not covered with firm solid fat, it must impair their digestive powers, and render the liver torpid and perhaps swollen; mixed with water and barley-meal, or other farinaceous food, it may be admissible, but this is the best that can be said of it.

GREEN AND DRIED VEGETABLES.

There are many vegetables useful in the feeding of pigs, amongst which may be enumerated clover, sainfoin, lucern, chicory, tares, vetches, pea-haulm, cabbages, turnip-tops, &c.; it is desirable that these, when given, should be cut up small, and mixed with the wash—indeed simply cut up, with a little salt scattered among it, and occasionally mixed with a little pollard, it constitutes a good diet for store pigs, where the aim is not to fatten them but to keep them in fair condition. Indeed it is not advisable to render store pigs too fat or high in flesh; they grow larger, and their symmetry is better developed, by moderate diet than by full feeding, and afterwards, when put up to fatten for bacon, they thrive rapidly on the increased quantity and quality of the nutriment.

Clover or lucern hay, cut up small and mixed with the wash, is also recommended, and, where it is practicable, an occasional or indeed a frequent run on good grass land tends to the advantage of the animals. There are some wild plants, as the

sow-thistle (*sonchus*) and others, of which swine are very fond, yet it would appear that these animals, omnivorous as they are, are choice in the selection of their vegetable fare, rejecting many plants on which the horse, ox, sheep, and goat will feed with avidity. It is remarkable that although the hog will champ the fresh green shells of peas, it does not swallow the tough inner lining, and only drains away the saccharine juice, rejecting the rest.

ROOTS.

Among the roots given to pigs in our island, potatoes take the first place; indeed, on looking over the articles of diet on which the pigs of the cattle-shows of 1846 and 1847 were fed, no other root is mentioned. These should always be steamed and mashed, and mixed with whey or skimmed milk, with the addition of middlings, barley-meal, peas, &c. Pigs, as we have previously intimated, however apparently well fed on potatoes, do not produce firm bacon, which swells greatly in boiling. Hence potatoes ought to form a portion only of their diet, nor indeed are they essentially necessary. In the Channel Islands the store pigs are fattened almost entirely upon boiled parsnips, and they attain to an enormous size, yielding good bacon. Among other roots we may mention carrots, turnips, especially Swedish turnips, and beet-root. All these roots should be boiled, but may be given raw, though not so advantageously. Carrots are highly esteemed by many, and no doubt contain a considerable quantity of nutriment, and in addition to meal may be used with advantage, especially when potatoes are dear and scarce in consequence of a general failure in the crops. They might, even when given alone, with the addition of whey, or butter-milk, or skim-milk, make the animal reasonably fat, as in the instance of parsnip feeding, but we should doubt whether the quality of the bacon would prove first-rate.

The same observations apply to Swedish turnips, which are extolled by some as superior to potatoes; indeed a writer in the *Farmer's Gazette* for November, 1844, who dates from Ballymore, near Arklow (Ireland), and who for many years has been in the habit of feeding pigs for the Liverpool and Dublin markets, bears testimony to the excellence of steamed Swedish turnips; and though he acknowledges his pigs are rather behindhand than otherwise, yet he describes them as thriving fairly, and at one-half of the expense incurred by the use of potatoes in their stead. He allows them a plentiful supply of the steamed turnips, with a little broken corn and wheat chaff, and about a pint of butter-milk to every three pigs, and considers that by the Christmas of that year, his hogs will average from 4 cwt. to 4½ cwt.

What will be the character of the bacon produced by such diet is another thing; an animal may be made fat, but the fat may be soft, oily, and waste in boiling—and indeed such is the character of Irish bacon generally.

No roots, without a due admixture of farinaceous food, as pollard, barley-meal, peas, &c., will produce first-rate bacon, and indeed in the finishing off, or last stage of feeding, it is better to omit the roots altogether, and give only peas, barley-meal, whey, &c. The same observations apply to *pork*; even young delicate dairy-fed pork requires to be finished off on a mixture of farinaceous food with the refuse of the dairy, in order that the meat may acquire a due degree of firmness. In this respect as well as in age pork differs from the sucking pig; in the latter, tenderness and succulency are in the extreme, they render the young creature, when well cooked, one of the most delicate of “all the delicacies of the whole *mundus edibilis*,” but, as Lamb says, the fat is not to be called fat, “but an undefinable sweetness growing up to it—fat cropped in the bud, taken in the shoot, in the first innocence, the cream and the quintessence of the pig-child’s yet pure food.”

THE CEREALIA OR GRAIN, AND BEANS AND PEAS.

By the *cerealia* we mean rye, barley, oats, wheat, Indian corn or maize, rice, and all their varieties, under whatever name they may be distinguished. To dwell upon the nutritive qualities of grain in general would be useless. The value of barley-meal, middlings, mill-sweepings, &c., in the feeding of pigs, is too well known to require comment. It is true that this food is expensive, but then it is not used exclusively till the time for finishing off, or need not be; and, what is more, the expense is repaid by the gain of the animal in weight, and by the great superiority of the meat, which will command its price in the market. The rapid increase in the weight of pigs fed upon barley-meal, peas, steamed potatoes, with whey or butter-milk, is astonishing. They have been known to increase at the rate of $3\frac{1}{2}$ lbs. (live weight) per day, and often at the rate of 2 or $2\frac{1}{2}$ lbs. Here is some remuneration certainly for extra expense, even if the finishing off be entirely on meal and skim-milk.

There is only one legitimate way of giving barley, and that is in the form of meal, made into porridge with lukewarm milk, whey, or water, to which potato-meal may be added or not, as is deemed desirable. To give the grain in a raw state, or even bruised, or infused in water till it begins to swell and germinate, is, we consider, very disadvantageous; it is, in fact, attended by two evils—in the first place, the greedy animal does not sufficiently grind down the food for the complete extraction of all its nutriment; and,

secondly, semi-champed grain is liable to produce indigestion, loss of appetite, and fever. The same effects are produced by mixing the meal with boiling fluid, which converts it into a sort of dough or paste, very unfit for being taken into the stomach.

Some recommend that the meal be mixed with cold water in large cisterns, the proportion being five bushels of meal to a hundred gallons of water. This mixture must be stirred several times a-day for a fortnight or three weeks, until an imperfect fermentation takes place, and it becomes acescent. In this state its fattening powers are said to be greatly increased; but the ordinary way is to mix the meal with lukewarm water, or whey, or butter-milk (pea-meal or potato-flour being added or not), and give it in the form of a thick soup to the animals. In 1846, a pen of three Colleshill pigs, exhibited by the Earl of Radnor, and which gained the first prize (£10, silver medal to breeder, and gold medal for the best pen of pigs), was fed on forty-eight bushels of barley-meal mixed with whey, and about six bushels of potatoes. The pigs were forty-five weeks and one day old. Next to barley-meal, oatmeal may be ranked in order, and in some counties it is largely given. We have seen the meal made up into good-sized balls with warm water, and given to the pigs in butter-milk or kitchen-wash, with decided advantage. It may be made into a sort of thick gruel with wash or whey, &c., or it may be mixed with water, set to leaven, and given in an acescent state.

Maize takes a high rank among the articles, under the title of *cerealia*, used for feeding pigs. It is little, if at all, inferior to barley, and the animals are very fond of it. It may be ground into meal, or given in its natural state, after being soaked for some time in water, either alone, or in the wash, or in gruel. On many parts of the continent, and in America especially, where many varieties of maize or Indian corn are extensively cultivated, the flesh of pigs, and also poultry, fed upon maize has a peculiarly fine flavour.

Maize is not much grown in England. A writer on maize gives us the following account:—“It seems that there is a particular line on the continent of Europe north of which the maize does not thrive. To the south of this line, which passes through Nancy, formerly the capital of Lorraine in France, it has, in a great measure, superseded wheat and rye as the common produce of the land. The bread made from maize is not so palatable as wheat or rye bread; but by mixing it in certain proportions with wheat it makes a very pleasant food. In the United States of North America, Indian corn forms almost the only bread eaten by many of the people; and in the slave states it is the only bread that the negroes eat. It is not, however, in the shape of

baked bread that maize is most generally used in Europe, but in boiled messes and soups, as peas are with us. It is not only the ripe grain which is eaten, but the ear in every state, from that of a green vegetable to an unripe corn. It is boiled, stewed, and baked. It is a substitute for green peas and cabbage in its early stage, and is used in some way or other to its complete maturity. Nothing can be better than ripe maize to fatten hogs or poultry with, and the young stem, cut down quite green, gives one of the best and most abundant varieties of green food for cattle."

Occasionally *rice* has been used for fattening pigs, but we can say nothing respecting its advantages from personal observation. One great objection to this article would be its expense, and we should not think it equal to barley-meal, although we admit that it abounds in nutriment. The proper way to prepare it is to put the rice into boiling water (two ordinary pailfuls to about forty gallons of water), and let the whole stand for several hours till it is cold. The rice will then be found to have swelled amazingly, and to be compacted into a mass so firm as to admit of being taken out by means of a shovel. In this state it may be given to the pigs, either with whey, milk, &c., or by itself; a certain portion of potatoes mashed after steaming may be added. The flesh of pigs fed on rice is said to have proved very superior. It is not, however, mentioned as having entered into the diet of any of the pigs exhibited at the Smithfield Club Cattle Show, either for 1846 or 1847. *Peas* and *beans*, either in their green state, or dried and bruised, or ground into meal, are among the best articles of food for fattening swine. *Pea-meal*, that is, the meal of the gray pea, or gray peas bruised, are in the highest esteem. *Pea-meal* may be given alone, or added to the barley-meal, or to the steamed potatoes.

Buckwheat (*Polygonum fagopyrum*) is not very generally cultivated in our island, it is however grown in Norfolk and Suffolk. It is not well adapted for cold wet soils, but flourishes on warm light sandy land; hence on many parts of the continent where the land is poor and light, unfavourable to the growth of oats, and not rich enough for barley, buckwheat is a great resource. As a principal crop therefore it is confined to some parts of the south of France, and other countries similar in soil and situation; it is sown as a secondary and occasional crop in Switzerland, Germany, and Flanders. In England, as we have said, it is seldom sown, except in Norfolk and Suffolk; although small patches are occasionally to be met with elsewhere, for the sake of encouraging pheasants, which are particularly partial to the grain.

Buckwheat as a grain may be given to horses, mixed with oats or by itself. No grain is more

greedily devoured by poultry, or makes them lay eggs so early or so abundantly. The meal is excellent for fattening pigs, and the flour, though from its deficiency of gluten it does not make good fermented bread, is much used on the continent for pastry, cakes, and such delicacies. With respect to rye little need be said; occasionally pigs are fed upon rye-meal; in England very little rye comparatively speaking is grown, and then chiefly as a green crop for early spring fodder.

SEEDS OF VARIOUS VEGETABLES, FRUITS, &c.

Linseed cake, or oil-cake as it is called, is occasionally given to pigs, and sometimes linseed meal, or steeped linseed, but only in small quantities, and in addition to food destitute of oil, as potatoes, pea-meal, &c. Oilcake is used largely in the fattening of horned cattle, but whether it is equally advantageous in the fattening of pigs is not very clear. Linseed is only twice mentioned as forming part of the diet of the pigs of the show for 1846 (No. 236 and 242); it is not mentioned in the catalogue of 1847 as far as the pigs are concerned.

Beechmast is eagerly devoured by pigs, and in places where this is abundant, it will be well to turn store pigs upon it, or collect it for their use; it will keep them in fair condition, but not fatten them, or rather not load them with firm fat; nevertheless it is an article of diet not to be despised, be it understood as an adjunct and not a principal article. It is the favourite food of the squirrel—and where beech woods are extensive, there that graceful little creature is numerous. But though pigs thrive on this food, it will not make firm fat, unless mixed largely with acorns; these, as we have seen, are often given raw, as they fall from trees spontaneously or are beaten down. But this is not the best plan; acorns should be collected and dried, and then slowly baked, crushed, and afterwards boiled into a sort of gruel with a little salt; this food is excellent. But we count not upon it in England, our great oak woods are gone, and it is only here and there that a farmer may thus add to his store of pig-food. Formerly it was otherwise—

"Gone the merry morris den,
Gone the song of Gamelyn,
Gone the tough-belted outlaw
Idling in the grené-shaw.
All are gone away, and past,
And if Robin should be cast
Sudden from his tufted grave,
And if Marian should have
Once again her forest days,
She would weep, and he would craze;
He would swear, for all his oaks,
Fall'n beneath the dockyard's strokes,
Have rotted on the briny seas!"

KEATS.

Well, if our oakwoods be fewer and narrower, our pasture lands and our arable lands are broader,

and the true system of managing cattle has attained to the rank of a science.

A run in oak copses ought not to be neglected, however, at the time of the fall, by a farmer who has the opportunity of sending his store pigs into the wood. We have already alluded to the pigs of the New Forest.

Only one mention of *acorns* occurs in the catalogues of the cattle-shows of 1846 and 1847; it is in 1847.

"181. Mr. Charles Eley, sen., of Heathfield Farm, near Hounslow, Middlesex—A pen of three 13 weeks and 3 days old improved Berkshire pigs, bred by himself, and fed on barley-meal, *acorns*, and skimmed milk."

We cannot help thinking that acorns are too much neglected; we have seen them gathered largely in the neighbourhood of Dorking, and no doubt the cottagers found this produce to their advantage.

Chestnut trees are not grown in vast numbers in our island; in Greenwich Park indeed we are struck with their magnificent stems, and bright glossy foliage, and for ourselves, we never saw so many elsewhere on an equal circle of ground. In England, chestnuts as food for pigs are out of the question. This is not the case, however, in many parts of the continent, where these trees are abundant, and indeed where they form portions of woods, and flourish as the towering trees of copses. There the chestnut tree affords an abundant supply, both for men and swine, and the latter are bountifully supplied with it; it is seldom given raw, but roasted, or steamed, or parboiled into a pulp, then crushed and divested of the outer shell. By the conversion of it into a potato-like meal the nutritive qualities of this fruit are greatly improved, and it is thereby better fitted for the digestive action of the stomach.

With respect to apples, pumpkins, and even peaches, which in some parts of America are lavishly given to swine, we have little to say. Apples in their raw state may keep up the flesh of store pigs (turned in orchards to devour the wind-falls); and boiled apples mixed with potatoes, Indian-corn flour, or buckwheat, will no doubt prove nutritious, and in America constitute a cheap diet, but the case is different in England; and as for pumpkins and peaches, we have no observations to make; we doubt their fitness for feeding swine, and what is more, they are not in our country plentiful as blackberries, which latter, by-the-by, might be found quite as beneficial. In North Africa, as before intimated, the wild boar makes incursions into the melon-grounds, and we can conceive that melons abounding with saccharine matter are grateful to the palate of the wild hog, and so no doubt are apples, pumpkins, and peaches, but they do not enter into the English bill of fare

for pigs. At the same time, we object not to the plan of turning pigs into apple orchards in order that they may pick up the fallen fruit.

We may here notice a few other articles which do not come under any precise head. One of these is *hay-tea*, or rather an infusion of clover, sainfoin, or lucern hay, which is by many recommended as an excellent vehicle for mixing with other food. It may be thickened with potato flour, steamed carrots, boiled cabbages, barley, or oatmeal, and for store pigs, in particular, it is said to be excellent, not only as keeping the animals in first-rate condition, but as saving more expensive kinds of food which must otherwise be given.

Another article is *salt*. Salt is almost essential to health; it stimulates the appetite, it aids the operation of digestion, and all cattle are partial to it. A little salt should, therefore, be scattered into the food before it is given to the animal. It is, however, very singular, that though salt is so wholesome, brine in which pork or bacon has been pickled, is poisonous to pigs. We have never ourselves seen the poisonous effects of brine; but there are several cases on record in which these animals have died, in consequence, as Mr. Youatt affirms, of a small quantity of brine having been mingled with the wash, under the mistaken impression that it would answer the same purpose, and be equally as beneficial as is the admixture of a small quantity of salt. We know not how to account for this, and we take it upon authority.

We must not here exclude *earth* or *calcareous* matters from our consideration. With the roots which a pig ploughs up in the ground and devours, a small quantity of earth is necessarily swallowed, the calcareous particles of which act beneficially by correcting any acidity in the stomach. Pigs put up to fatten, highly fed, and taking little or no exercise, are very liable to acidity of the stomach, and loss of appetite as a consequence. Many breeders, aware of this, give the animals occasionally ashes or cinders, which they champ and swallow; or turn them out now and then upon a patch of ground, over which lime or chalk has been freely sprinkled, in which they root and pick up morsels, which, with the lime and particles of earth, are swallowed. It is not a bad plan to mix occasionally a little magnesia in the wash or milk; this will very effectually correct acidity. These observations, which to some, perhaps, may appear strange, apply not only to the hog but our domestic gaminivorous animals generally. Oxen and sheep necessarily swallow particles of earth; calves are fond of licking chalk, as if impelled or directed by instinct in the act; and we have seen horses pull up little tussocks of grass or herbage, and swallow the sandy earth adhering in not a trifling quantity to the roots, and that with evident satisfaction; nay, choice was exercised in the

selection, ourselves being witnesses. Here, then, we have another reason why a run from time to time in the fields given to hogs is advisable; with every root, every pig-nut that they swallow, they take in a portion of earth. We may state, having mentioned the pig-nut, that there are two species in England which afford the tuberous roots so greedily devoured by swine, viz.—*Bunium bulbocastanum*, and *B. flexuosum*. The extirpation of these umbelliferous plants from fields and meadows is very desirable; in this the hog does good service. The plants are not eaten by cattle; and are in fact noxious if not poisonous, but the tuberous root is sweet and perfectly wholesome. We have, when a boy, eaten it hundreds of times; in the meadows of Cheshire it is extremely abundant, and in other counties also;—query, could not the large species (*B. bulbocastanum*) be grown with advantage for pigs? It is a tuber too much neglected, and when steamed would, we hesitate not to say, prove extremely nutritious. We merely throw out the hint, in these days of potato-failure, as worth some consideration. All our edible roots and vegetables have their wild origin. The garden carrot, numerous as are the cultivated varieties, is only the descendant of the common wild carrot of the hedge-side (*Daucus Carota*), also an umbelliferous plant, belonging, as does the pig-nut, to the class *Pentandria*, order *Digynia* of Linnæus. The same observations apply to the parsnip (*Pastinaca sativa*), and the celery (*Apium graveolens*), plants which have been made what they are in gardens by cultivation. We might adduce multitudes of examples, but we have adhered to the umbelliferous tribe. Chance has brought some plants into notice; while others, equally valuable, have been neglected. But this is a digression, yet not, perhaps, altogether out of place.

Having thus generally discussed the articles of diet given to pigs in our islands, we may next proceed to a few observations respecting the mode in which these animals should be fed, so as to bring the best profit to the feeder.

SUCKING PIGS.

Sucking pigs are usually killed at the age of three weeks or a month old; they are, of course, unweaned, taking little or nothing but the mother's milk; therefore, respecting their diet, a few remarks only are required. Sucking pigs bring considerable profit; a dairyman, or miller, or farmer, keeping three breeding sows, each of which brings him ten pigs twice a-year (that is sixty sucklings), may dispose of twenty-two or twenty-three of these at the age of three or four weeks, for the gross sum of about £10, at least in the neighbourhood of London, and some other of our larger towns. Each sucking pig will weigh from nine to fourteen pounds when dressed, according to the

breed, and sell at the rate of 10*d.* or 11*d.* per pound, sometimes even 12*d.* This sum tells in well for the purchase of provision for the store lot and the breeding sows.

Although a "sucking-pig" ought to live on its mother's milk for the first fortnight or three weeks, yet it often happens, especially when the litter is numerous, that the sow becomes overdrained, and too weakly to supply her brood with a due degree of nourishment. In this case, they must be fed; and if they be ten days or a fortnight old, little difficulty will be experienced in supplying their wants; it is true they will not be able to feed, but warm cows' milk must be given them three or four times a day by means of a common tea-pot, the spout of which may be covered with wash-leather; at the same time, the mother ought to have nutritious and succulent diet, in order to keep up her strength and increase her flow of milk. In the course of six or eight days a small portion of flour or barley-meal may be added to the milk; and after that, potato-flour, mashed carrots, or turnips, boiled cabbage-leaves, &c. In a very short time they will eat of themselves, and should then be supplied with little troughs, so placed as to be secure from the depredation of older animals, in which their milk and vegetable diet should be put at stated intervals. They will run after their accustomed feeder; nay, even intrude into the kitchen or cottage, and become perfectly familiar. One of the most beautiful and fertile sows we ever knew was taken from its mother, and reared up by hand, from the age of about ten days or a fortnight, by the wife of an industrious cottager in Gloucestershire; she carried it down from London (where she obtained it as a present), per railway, in a little basket on her knees. It was of the Chinese-Berkshire breed; we say was—it is still alive, and celebrated in the neighbourhood of the village in which it is located.

Now as regards the weaning of pigs, this change may be effected without much trouble, between the age of seven, eight, or ten weeks. The process of course is gradual, for though the young brood be accustomed to the trough, still they will from time to time run to the mother, and attack her dugs, now no longer replete with a full flow of milk. Here the mother's condition must be consulted, and the mode of weaning must be managed accordingly. An abrupt separation between the young animals and their dam is not generally speaking advisable; it should be done by degrees, in accordance with the condition of the dam, and the aptitude for trough feeding displayed by the young, always supposing that a good diet of skim-milk and farinaceous meal is prepared for them. At first they may be allowed access to the mother once or twice during the day, and also during the night; afterwards they may

be kept apart from the mother during the day, and having been well fed before bed time, they will trouble her but little during the night; in a few days they may be entirely separated from the dam, to whom the boar may again be admitted.

The food of the young pigs should consist at this time of skim-milk, whey, or butter-milk, with potato-flour or barley-meal, and they should be allowed the run of a paddock or grass field during the middle of the day, or free admission into the straw yard. They will there exhibit their instinctive appetites and gambol about, exercising their limbs, and as they increase in size growing up strong, vigorous, and well formed. Their sleeping place should be delicately clean, provided with a sufficiency of good straw, and impervious to wind and water, and food should be given them early in the morning, two or three times during the day, and in the evening before going to rest. Clean water should always be accessible for drinking.

At this time, the young males intended for porkers or bacon-hogs should be castrated, and the females, except one or two selected as breeders, spayed. These operations are performed by persons who make it their business, and need not therefore be described; we will only say that all needless pain should be avoided, both for the sake of humanity and of safety, for if by tearing the cord rudely torture be inflicted, tetanus or locked jaw is very liable to supervene, and the animal will perish. It is best to have these operations performed when the animals are from four to six weeks old; at a later period the danger is increased. The after treatment is very simple; they should be confined for a few days in a warm sty or restricted to a straw-yard, and fed upon skim-milk or whey, with a little meal; the wounds generally heal rapidly.

It not unfrequently happens that sows, after having produced two or three litters, are put up in a sty in order to fatten for the produce of bacon. It will be necessary to have them previously spayed, at least they will fatten much more quickly after this operation, although there is considerable risk in it; as it respects sows of the age of six or seven years, or when a decline in the reproductive powers is manifest by the decrease in the number of young produced at each parturition, the necessity of this operation is less required. Some breeders make it a rule to spay their sows, however good as breeders, in the second or early in the third year, and fatten them as quickly as possible for the butcher.

Ringling is another and very painful operation which pigs have to undergo, but one which is generally deemed necessary, in order to prevent them from using their snouts with due effect, not only in the field, but in the sty, the pavement of

which, if of brick, they would soon demolish, a purchase upon one brick being once obtained. For ourselves we doubt the absolute necessity of ringling; the pavement of the sty should bid defiance to their endeavours, and as for the field, if they cannot there use their snouts freely, half the benefit of turning them out is lost. Again, pigs intended to be killed as porkers, at the age of four, five, six, or seven months old, may be surely exempted from this torture, however necessary it may be for store and breeding pigs.

The ringling should not be performed until after the pigs have recovered from the operations previously mentioned: as the animals grow, a repetition of this painful process will have more than once to be repeated, but on no account on a pregnant sow, as the pain is not unlikely to cause abortion; her nose ring ought to be looked to before the boar is admitted, and its security ascertained.

Some recommend that, while the pig is young, an incision be made through the cartilaginous prolongations by which the supplementary snout bone is united to the proper nasal bones. The divided edge of the cartilage will never unite again, and the snout will always remain powerless. An unsightly gaping gash, rendering the snout powerless (which ringling does not *in toto*), is anything but desirable. The operation is utterly barbarous, and would never be allowed by any one possessing the feelings of common humanity. How would a man like to have his nose split down at the edge of the nasal bones? *Ringling* is bad enough, but *splitting* is ten times worse, and altogether objectionable.

PORKERS.

Supposing the brood to be weaned at the age of eight or nine weeks, those destined for porkers may be allowed the range of the paddock or straw-yard for three or four weeks, being at the same time regularly fed on the refuse of the mill and dairy; where, as in the case of market gardeners and other such, a degree of liberty can not be allowed, we recommend that the sty-yard be as roomy and extensive as possible. During the last ten days or fortnight, the feeding may be pushed, and more barley-meal, pea-meal, and milk allowed. Too many pigs should not be kept together in the same sty, nor should they be of unequal ages, as the larger are apt to persecute their younger co-mates, and drive them from the trough. Porkers are killed at different ages, varying from about three months to seven months old. We consider that the true dairy-fed pork is in perfection when the animal does not exceed the age of about three months, or ranges from three to four months; large pork is apt to be coarse and over fat, and consequently not so digestible as younger meat, and is therefore not so much sought

for in the London market. It bears a lower price than small pork, and though the pig weighs heavier, still taking the extra keep into consideration, it is perhaps not more profitable; on such points as this, however, the breeder will always consult his own interest, and study the demands of the market.

STORE PIGS.

Of store pigs little need be said—they are intended either for sale, or as future bacon-hogs. They should be kept in fair condition, not too low, and their health should be attended to; they should be allowed to run in the fields, or in the woods and copses, when the beech-mast or acorns are falling, and be regularly and moderately fed at certain intervals, say in the morning and evening; knowing their feeding times, by habit, they will never willingly be absent, and wherever they may ramble during the day, their return at the appointed time in the evening may be safely calculated upon. After their evening meal they should be secured in their sty, and snugly bedded up.

HOGS FATTENING FOR BACON.

Bacon-hogs (we here except breeding sows destined after two or three litters for the butcher) are generally put up to fatten at the age of twelve or eighteen months. Under the term bacon-hogs, we include the barrow pigs (that is the castrated males) and spayed females, chosen by the breeder or feeder for fattening, after the age admissible as porkers. In the fattening of bacon-hogs much judgment is requisite. It will not answer to over-feed them at first; under such a plan they will lose their appetite, become feverish, and require medicine. *They should be fed at regular intervals*; this is essential; animals fed regularly thrive better than those fed at irregular intervals, nor should more food be given them at each meal than they will consume. *They should be sufficiently satisfied, yet not satiated.* It would be as well too to vary their diet; middlings, peas, potato-meal, and barley-meal may be given alternately, or in different admixtures, with wash, whey, butter-milk, skim-milk, and the occasional addition of cut grasses, and other green vegetables; a little salt should be scattered in their mess, it will contribute to their health, and quicken their appetite; a stone trough of clean water should be accessible, and the feeding-troughs should be regularly cleaned out after every meal. The sty should be free from all dirt, and the bed of straw comfortable; indeed it is an excellent practice to wash and brush the hides of the animals, so as to keep the skin clean, excite the circulation of the cutaneous vessels, and open the pores; pigs thus treated will fatten more kindly than dirty scurfy animals, put upon better

fare. We fear, however, that this essential point is greatly neglected, from the too common idea that the pig is naturally a filthy brute, than which nothing can be more untrue; it is the keeper who is filthy, and not the animal, if he constrain a pig to wallow in a disgusting sty.

Too many pigs should not be fed in the same sty, three are sufficient, and they should be, as far as possible, of the same age; and the meals should be given frequently, but only in moderation at each time, over-gorging is sure to cause indigestion, and the only remedy for this is abstinence; a little sulphur occasionally mingled with their food is useful. When the store hogs are first put up (and we must suppose them in moderate condition), the food should be only a few degrees superior to that on which they have already fed; it should be improved step by step, till the digestive powers are adapted for that of the most nutritious quality; and with this the fattening must be completed.

A bacon-hog is generally fattened in autumn, and killed about Christmas, sometimes after Christmas, sometimes a few weeks before. The average length of time required for bringing the animal into good condition, varies from about fourteen to twenty-one weeks, according to size and breed; some fatten hogs until they are incapable of moving, from the enormous load of fat with which they are burthened, and in order to accomplish this, four, five, or even six months are required. An animal so fed will certainly not pay for its food, nor can it be deemed in health; the heart and lungs will be oppressed, the circulation impeded, and the breathing laborious; sufficient fatness is all that is desirable. A fat hog is a comely comfortable-looking animal, the embodied type of epicurean felicity; but a bloated overladen hog is a disgusting object, uneasy and distressed in its own feelings, incapable even of enjoying its food, buried in its excessive pinguitude.

The quantity of barley-meal, pea-meal, or other farinaceous food (exclusive of wash, skim-milk, &c.) consumed by a hog during the time of its fattening for bacon, will vary greatly according to the size and breed of the animal. Three Colleshill pigs, somewhat more than forty-five weeks old, were fed by the Earl of Radnor on forty-eight bushels of barley-meal mixed with whey, and about six bushels of potatoes. They gained the first prize. This gives sixteen bushels of barley to each pig; but the time during which the fattening process was carried on is not specified. A single pig fed by the same nobleman in 1846, and of the like age, consumed sixteen bushels of barley-meal mixed with whey, and one bushel of potatoes. (*Silver medal.*) However, we must not quite take the amount of meal given to prize pigs as a standard. Taking the average, and supposing the pig's age

to be fourteen or fifteen months, and the animal to be in fair condition, we should say that ten or twelve bushels of meal (that is barley-meal, pea-meal, &c.) would be sufficient for every useful purpose; well do we know that much less often suffices. But we are supposing the production of first-rate bacon. Porkers, of course, require a less outlay according to their age; a porker ought not to carry too much fat; neither the feeder nor the buyer profit by over-fed pork, though perhaps the pork-butcher may—he retails it per pound to his customers. Our observations, however, do not apply to the respectable dealers in pork in London and its environs, who exhibit the most delicious country-fed meat, and justly pride themselves upon an article of consumption which brings them the first-rate custom.

With respect to estimated tables relative to the increase in weight of pigs under certain modes of feeding, and under given quantities of food, we hold them to be utterly fallacious. The feeder's means, the produce of his ground, the breed he adopts, and the proportion of attention he bestows on the porcine part of his stock, which will be regulated by his profit therein, will make all the difference, and must be taken into the account. To the farmer (we speak not of others) the profit to be derived by him from feeding porkers or bacon-hogs will depend upon *suitability*, or the apposite union of circumstances connected with the locality, conveniences, and staple returns of his land. It is one thing to keep a few pigs for home consumption, and another to keep them as a source of income.

CHAPTER VI.

ON THE DISEASES OF SWINE.

As we have stated in our histories of the 'Ox' and the 'Sheep,' we profess not to direct the veterinary-surgeon, nor yet to give the breeder, feeder, or farmer, false confidence in himself. Humanity, as well as sound policy, demands that in cases of illness or accident, the aid of the veterinarian should be promptly called into requisition. All *tampering* is unwise. Previously, however, to speaking of any particular disease, a few observations may be permitted. Pigs are far less manageable than oxen or sheep, they resist all manipulation, they rebel against anything like coercion, and can neither be bled nor drenched without difficulty.

BLEEDING.

Bleeding is often requisite, but it is not an easy task to cause a good and free flow of blood. It is useless to attempt an incision of the jugular vein, this is too deep in the fat of the neck, and no pressure or ligature will make it swell, nor indeed would the thickness of the hide even in a thin pig permit it to be clearly visible.

There are, however, modes by which blood may be obtained, irrespective of cutting off part of the tail, or slitting the ears, the practice most commonly adopted. One plan is to turn back the ear and open one of the large veins ramifying on the inner surface near the base; we need scarcely say that a lancet must be used. Another plan is to open the brachial or *plate* vein, running along the inside of the fore leg, at a little distance above the knee, a tight ligature being previously placed round the limb, just below the shoulder. Some recommend an incision into the palate veins,

which run one on each side of the roof of the mouth, but there is great difficulty in securing a pig in order to perform the operation. On the whole, the brachial vein is the one to be selected, especially when a copious flow of blood is considered necessary.

DRENCHING.

The forcible administration of medicine to pigs, especially to large and strong animals, is rarely practicable, so violent and determined is their resistance. It will require the efforts of two or three powerful men to secure a good-sized hog; and even then the animal, by its strenuous exertions, may defeat every attempt on their part to administer the medicine; indeed, from this cause there is some danger of choking the beast, and a still greater probability that the conflict will aggravate the disease (especially if of an inflammatory nature), or occasion the rupture of some internal blood-vessel. The best plan, and it may be generally managed, is to cheat the animals into taking physic with their food. It will save much trouble, and the chance of any accident.

Having said thus much, by way of a brief preface to this part of our subject, we may proceed to notice the diseases and casualties to which the domestic hog is more particularly subject—but of which most might be prevented by attention to diet, occasional doses of sulphur, and cleanliness. Prevention is easier than cure.

FEVER.

Pigs in crowded filthy sties, irregularly fed, and not allowed a sufficiency of water—or such as

have been kept upon a low diet, and are then suddenly placed upon the very contrary in the extreme—are not unlikely to suffer from an attack of fever, connected with inflammation of some of the internal viscera. Dulness, redness of the eyes, dryness and heat of the nasal disc and the lips, heat of the ears and skin generally, great thirst but loss of appetite, are the prevailing symptoms. The pig, like all animals fattened in confinement, is a bad subject for disease, and is liable to sink rapidly under any acute attack.

The first thing to be done is the abstraction of blood from the ears, brachial vein, or tail; this must be followed by aperients, even if it be necessary to drench the animal. Should its appetite be not altogether lost, the animal may be cheated into taking half a drachm of jalap, or less (according to the age and size of the animal), with five or six grains of calomel; or two or three drops of croton oil, made up with bread-crum into a pill. A drench may consist of a couple of ounces of castor-oil, with gruel; or of senna tea, salts, and a little jalap; or of salts and castor-oil mixed in gruel. To aid the operation of the medicine, enemata should be administered, and a little nitre be added to the water, as a cooling drink. If the animal does not refuse food, two or three pints of warm gruel should be given at intervals. In the course of a day or two the aperients, should it be deemed needful, may be repeated, and the same diet continued for some time. By these means, an animal may be restored in the course of a few days if the disease be treated in time.

CONTAGIOUS INFLAMMATORY EPIDEMICS.

Inflammatory epidemics, assuming a typhoid form and rapidly terminating in death, occur among pigs not unfrequently in our country, but still more so on the continent.

The cause of these epidemics is obscure. Some attribute them to unwholesome food, to ill-ventilated sties, to exposure to heat or to wet and cold, to want of water, &c. But these things affect only individuals; and we see not, though they may cause the illness and death of many animals, how they can produce an epidemic disease—which, moreover, is asserted to be contagious, like the small-pox.

The symptoms of these epidemic diseases somewhat vary; but they begin with the usual symptoms of fever, which soon assumes a typhoid form. At first the animal appears dull, and neglects its food; it evinces great thirst; the bowels are constipated, and the urine diminished. The animal groans, the abdomen becomes hard and tumid, the flanks heave, and the breathing is short and oppressed. Afterwards there is a distressing cough; the eyes become watery, the mouth not unfrequently covered with ulcers, and mucus drips from the

nose; the skin is covered with petechiæ or gangrenous spots; the animal reels or becomes paralysed, sinks on the second, third, or fourth day, and often dies convulsed.

On examination after death, the chest is found filled with bloody serum, the lungs diseased, and the pleura exhibiting traces of inflammation; the heart is gorged with blood, as is also the liver, and the intestines present traces of inflammation. The substance of the brain, moreover, is often found in a morbidly soft condition, and even that of the spinal cord.

There is little hope of doing any good in such diseases, except at the commencement of the attack. In the first stage, before the typhoid symptoms manifest themselves, bleeding is advisable, to be followed up by active aperient drenches and enemata; a seton should be made in the skin of the chest, and stimulating embrocations rubbed along the spine. The abdomen should be fomented with hot water, or the animal may be put into a hot bath, and the drink should be slightly acidulated with white wine vinegar; the diet should consist of gruel. Should these measures allay the inflammatory action, the animal will gradually recover, though it may be long in a weakly condition, and require great attention. We need not say that every pig labouring under illness should be removed immediately from the rest, and placed by itself. This observation applies generally, as well as in the present case.

PHRENETIS, BRAIN FEVER, OR INFLAMMATION OF THE BRAIN.

Inflammation of the substance of the brain or its membranes is not uncommon in pigs, especially when they are put suddenly upon an abundance of nutritious food, or food of too heating a quality. At first the animal appears dull, listless, and disinclined to move; the eyes are red, the bowels constipated, the pulse hard and quick. In a short time, as the disease makes progress, other symptoms appear—the animal becomes frenzied, runs wildly about, is incapable of discerning objects, and strikes against them; the respiration becomes laborious, the animal staggers, perhaps becomes paralyzed, falls, and dies. Effusion has taken place, or a blood-vessel has given way. In the first stage of the attack alone will any measures be useful. Blood must be freely taken, and active aperient medicines, with enemata, administered. A couple or three drops of croton-oil, with about a drachm of tincture of ginger, in a little gruel, has been found effective; as have also castor-oil and jalap, followed up by doses of sulphur. The head should moreover be kept cool, by means of cloths dipped in vinegar and water, with sal ammoniac dissolved in it.—(Vinegar 1 pint, water 2 quarts, sal ammoniac 1 oz.)

APOPLEXY.

Apoplexy is generally speedy in its course. A little previous dulness has perhaps been observed, suddenly the animal falls, struggles, becomes insensible, and dies. There is no time given for remedial measures, but the lancet should be instantly resorted to.

In some cases the course of the disease is not so rapid, nor the symptoms so severe. The animal does not fall, but staggers about, while its eyes are glaring and blood-shot, and their sight is dim or gone. The brain is gorged with blood, and instant relief must be given. The treatment must be the same as that directed for *inflammation* of the brain, and may perhaps be attended by success.

EPILEPSY.

This frightfully convulsive disease occasionally attacks swine, sometimes without any perceptible warning, except, perhaps, a little more restlessness than usual, which may have been displayed by the animal for two or three days previously, but without eliciting much notice. In most cases the animal drops suddenly, and becomes dreadfully convulsed. It shrieks, it grinds its teeth, the tongue, which is protruded, becomes bitten, blood and foam drip from its jaws, its eyes appear starting from their sockets, and roll wildly about, the limbs are alternately drawn up and then violently struck out, and every muscle is spasmodically agitated. After a longer or shorter duration, the fit begins to subside, and at last ceases; the animal starts up bewildered, and seems at first uncertain where to go. He gradually becomes more composed, and will perhaps even take food. One fit, however, is only the precursor of another, and several fits may even occur during the day.

The cause of epilepsy in these animals is obscure. Mostly, perhaps, it proceeds from cerebral irritation, resulting from too great a fulness of blood in the brain, or from some sympathy between the brain and spine, and visceral derangement, the presence of worms in the intestines, or a state of constipation.

With respect to the measures to be resorted to, it is evident that nothing, except throwing a little cold water over the animal's head, can be done during the continuance of the fit; but as soon as this is over no time should be lost: blood must be taken away, and smart aperient medicines and enemata administered. Salts, jalap, and three, four, or five grains of calomel should be made into a drench, and the salts be repeated at intervals till the bowels act freely. A cold lotion should be applied to the head, as directed in inflammation of the brain, and the animal kept in a quiet secluded place, as remote as possible from the other pigs; for if there lurks any tendency in

them to epilepsy (and as the mode of feeding has been on the same plan, this is not unlikely), the sight of their convulsed companion, and the noise of its screams, will very probably induce an attack. Indeed, we would advise that the whole of the pigs be treated with doses of medicine for the sake of safety. It is easier to prevent this disease than cure it. A pig that has had one epileptic fit is ever in danger of another. They recur more and more frequently, and the animal dies.

INFLAMMATION OF THE MUCOUS MEMBRANES OF THE NOSE, OR NASAL CATARRH.

This disease is indicated at first by a more than usual discharge from the nose. It gradually increases, and the animal is dull. By degrees the inflammation extends to the pharynx, gullet, and larynx. The animal now begins to cough. It swallows with difficulty, and holds down its head. The mucous membrane now begins to swell, and the nose to thicken and assume a distorted appearance; the mucus is mixed with blood, or a discharge from the nose of pure blood takes place, which perhaps gives a temporary relief, but in a short time all the symptoms appear in an aggravated form, and the animal gradually sinks.

Cold and dirt are among the causes of this disease. Some regard it as analogous to the glanders of the horse, and state that, like glanders, it is hereditary, and derivable from either the male or female parent.

The catarrh is only curable when taken in time. Aperient medicine, warm mashes, a clean dry sty, and abstinence from a stimulating diet of barley, peas, &c., constitute the plan of treatment. Some recommend the use of emetics.

INFLAMMATION OF THE GLANDS OF THE THROAT, QUINCY, OR STRANGLES.

This malady is extremely infectious, consequently no pig labouring under it should be permitted to remain in the same sty with others. It is somewhat insidious, or rather perhaps it is overlooked until the swelling of the throat is considerable, and the animal breathes and swallows with decided difficulty. No time should be lost in the treatment. The swelling will rapidly increase, and an effusion of serum will take place; the tongue now hangs from the mouth, dripping with saliva; the head is fixed in one position; there is a husky cough, and the breathing is laborious. The tumid part now becomes gangrenous; the animal rapidly sinks.

The treatment consists in the abstraction of blood, in aperient medicines, external blisters, and irritant embrocations to the throat, the hair being previously shaved off, and a substitution of cooling mashes, with a little nitre, for better food. Tartar emetic ointment is an excellent external irritant.

Should the swelling suppurate, open the abscess at the proper time, cleanse it thoroughly from the purulent matter, and apply a poultice. The ulcer will, if the pig do well, heal with a simple dressing.

INFLAMMATION OF THE LUNGS.

Like other animals, pigs are liable to this disease, which is vulgarly called "heaving or rising of the lights." It most frequently occurs in damp ill-ventilated piggeries, where noxious effluvia taint the air; sometimes, however, no assignable cause can be detected, though several pigs may at the same time be labouring under it; we may perhaps then attribute it to some condition of the atmosphere tending to excite it.

The first symptoms of inflammation of the lungs consist in dulness, fever, loss of appetite, a hurried respiration, heaving of the flanks, and an incessant cough, which is evidently painful; if now neglected, tubercles form on the lungs, they suppurate, and the animal dies in a state of pulmonary consumption.

The animal must be bled, and mild purgatives given. The hair between the fore legs and on the chest should be shaved off, and the skin well rubbed with tartar emetic ointment, as a counter-irritant. The animal should be put upon a diet of mashes, and kept in a dry warm place, and nitre sprinkled in the water of its drinking trough. If the pig can be cheated into taking it, sedative medicine may be given, composed of two grains of digitalis powder, six grains of antimonial powder, and half a drachm of nitre in gruel. The aperient medicine may consist of about four drachms of Epsom salts, and as much sulphur. We suppose the animal to be of a good moderate size. In severe cases a seton between the fore legs might be serviceable. Should the pig recover, let it be gradually fattened for the butcher. It is unwise to breed from a sow whose lungs are tuberculated.

INFLAMMATION OF THE BRONCHIAL TUBES OR BRONCHITIS.

Pigs, like oxen, and especially calves, are liable to this disease, with the same collection of worms in the bronchial tubes, indicated by a wheezy husky cough, loss of appetite, a laborious breathing, a disinclination to move, and a rapid falling away of flesh. The animal dies a mere skeleton, often suffocated at last by the thickening of the lining of the air tubes, and the collection of mucus and parasitic worms.

Should the inflammation happily be unaccompanied by the presence of these parasites, it may be subdued by bleeding, aperients, cooling medicines, and proper diet, but if they be present there is little chance of success; perhaps doses of common salt and lime water, as recommended by Mr. Mayer in the case of the sheep (dose of salt,

from one-half to one ounce; of lime water, three, four, or five ounces daily), may be useful, or Mr. Dicken's plan of a mixture of linseed oil, spirit of turpentine, and oil of caraways.

INFLAMMATION OF THE BOWELS, OR ENTERITIS.

Enteritis, or inflammation of the intestines, may be brought on by cold, wet filthy sties, bad food, and similar causes. The symptoms are fever, restlessness, laborious breathing, constipation, and a swollen state of the abdomen, which the animal often forbears to press on the ground, leaning only on its breast and fore legs; sometimes it walks round and round staggering, and sometimes forces its head against any object, as if for support. Prompt measures must be resorted to before the animal begins to sink.

Oleaginous purgatives and enemas must be freely administered, and the warm bath used, or fomentations applied to the abdomen. Castor-oil is the best purgative, two, three, or four grains of calomel may be added, or given separately. It may be perhaps advisable to take away a little blood. This disease often ends fatally, the mucous membrane of the intestine exhibiting points of ulceration, and black or gangrenous patches.

INFLAMMATION OF THE PERITONEAL COAT OF THE INTESTINES AND OF THE ABDOMINAL CAVITY, OR PERITONITIS.

In the human subject, the diagnostics between peritonitis and enteritis are far more clear than among our domestic quadrupeds. Brutes cannot express their feelings. Our dissections of animals of all kinds kept in the richest vivarium in Europe have proved to us that pure peritonitis is one of the most common diseases, and is seldom, nay never, cured; it runs a rapid and unsuspected course, the animal cannot explain its feelings, it appears drooping in the evening, it is dead by the morning. On dissection we find effusion in the abdominal cavity and peritoneal inflammation, often of surprising extent. Could the disease be taken "a principio," free bleeding, active aperients, enemas, warm baths, and fomentations, might be available; but how is this disease to be taken in time by the veterinary-surgeon, especially in the case of the hog? Peritonitis does not, as some say, "gradually waste away its victim," as we by long experience can testify; it is short, sharp, and sudden in its course. Hundreds and more of cases have come under our scalpel. Enteritis is slower, and this often involving inflammation of the peritoneum, may have induced some to suppose that peritonitis was the primary disease. With respect to treatment little is to be said. Bleeding, calomel, aperients, and enemas, are alone to be depended upon, but the time for administering these medicines is generally passed by when the most discerning veterinarian's

advice is solicited. In the human subject peritonitis is one of the most formidable diseases which the physician is called upon to combat.

INFLAMMATION OF THE LIVER, OR HEPATITIS.

This disease is uncommon in swine. The liver in these animals is of small size comparatively, and seldom seems to have its functions disturbed. In this respect the distance between the sheep and the hog is very great. Hence we may pass this viscus without comment.

INFLAMMATION OF THE SPLEEN, OR SPLENITIS.

Although the liver is seldom the subject of disease in this animal, the spleen is not so. Instances are on record in which congestion and rupture of the spleen has taken place, and more than this, one in which a certain absorption or wasting away of it had occurred, judging by a post-mortem examination; although, for ourselves, we are inclined to believe that a preternatural smallness of the spleen existed, irrespective of any disease in the case in question, seeing that the animal was healthy and fat, and weighed fifteen score.—*Veterinarian*, 1841.

The symptoms of inflammation or of congestion of the spleen are not very palpable; they resemble those of enteritis or peritonitis, and indeed in most cases the disease of the spleen may be regarded as secondary, being involved in the visceral mischief going on. We cannot separate the treatment from that recommended in peritonitis.

COLIC.

Pigs are sometimes, from over-feeding, or from improper diet, afflicted by an attack of spasmodic colic; they cry out, they run distractedly around their sty, they roll on the ground, the countenance expresses pain, but there is no fever, and the pains subside and then return.

Smart doses of castor-oil and ginger, in warm gruel with a little ale, will soon produce relief; the object is to act upon the bowels, and at the same time soothe them by a little cordial.

DIARRHŒA.

Diarrhœa occurs among swine in cold wet sties, fed upon unwholesome food and garbage; it is more common, however, among young pigs, and ought not to be neglected.

An allowance of good farinaceous food will check it, at least in general, and the calves' cordial, as directed in the 'Ox,' p. 175, may be resorted to if needful. The observations given there respecting diarrhœa are applicable here.

TETANUS.

If certain operations are so unskilfully and brutally performed as to give great torture, tetanus or locked jaw is very apt to supervene. Travelling

in broiling weather, and afterwards a sudden chill, have been known to induce an attack. It generally commences by muscular twitchings about the jaws, and spasmodic motions of the head and forelimbs; then the clenched teeth are ground together, the jaws are set, and the neck and shoulders become rigid. All attempts to force medicine into the throat are useless. Bleeding, enemata of castor-oil, and salts in gruel, the warm bath, and the application of irritating unguents or embrocations along the spine and round the jaws, may be useful. It is seldom, however, that the animal recovers, and then it owes its recovery rather to its firmness of constitution than to anything else.

RABIES, OR CANINE MADNESS.

This disease is communicated only by the bite of a rabid dog, fox, wolf, cat, or some other animal. The symptoms are awful; at an indefinite period after the bite, varying from three to six or eight weeks, the animal appears dull and refuses food; it begins to utter fearful cries, champs its jaws, foams at the mouth, and looks about with a wild suspicious glance; if it now feeds, it ravenously devours all sorts of filth, which it swallows convulsively; if not positively afraid of water, the animal shudders as it plunges its nose into the trough, and is unable to swallow the fluid, from which it retreats trembling, and if water be thrown over the animal, it dashes about in a state of delirium; the nervous system is wrought up to the highest pitch of morbid excitement. Some now become desperately savage, breaking down their inclosure, leaping over the gate or wall, and rushing at every person or animal with the intent to bite; at last they drop exhausted, and die convulsed. Others continue dull and inert, they stagger blindly about when they attempt to walk, become paralysed in the hinder quarters, utter plaintive cries, and gradually sink. Death usually takes place on the second or third day after the first appearance of the symptoms. All hope of cure is out of the question. No man, we presume, would sell the carcase of a pig that died rabid, even for the purpose of feeding a dog; it is yet a matter of doubt whether or not the flesh of animals which have died rabid can be eaten with safety. Schenkius relates an instance in which some persons who partook (not knowing it) of the flesh of a pig that died rabid, and which was served on the table by an innkeeper in the Duchy of Würtemberg, all shortly died of rabies, and similar facts are elsewhere on record.—See *Palmarius de Morb. Contag.* and *Shackmann on Hydrophobia*.

It seems almost useless to say that every particle of the straw of a sty in which a pig has died rabid should be burned; the sty, the door, the troughs, the walls washed with hot water, and then with a solution of chloride of lime, and that the sty should be kept untenanted for a considerable time,

LEPROSY.

This disease, which from the earliest antiquity was known to affect the hog, appears to arise from a vitiated state of the blood caused by damp, pestilential effluvia, bad food, and impure water. Leprosy consists in the development of small vesicles in all parts of the cellular tissue; they are found in the fat, in the cellular tissue, between the muscles, especially of the ham, the shoulders, the neck and jaws, and also underneath and around the root of the tongue; they occur in the intestines. These vesicles are regarded as a species of hydatid (*cisticercus cellulosus*), a parasite allied to that found in the brains of sheep.

The progress of leprosy is insidious; its first noticed symptoms are dulness and a degree of languor, but without perceptible fever, the breathing is not affected, nor is the appetite much abated. In a short time the skin becomes decidedly thickened, the bristles lose their firm adhesion, the vesicles in the cellular tissue lying subjacent increase, the hair begins to fall off, and the skin to ulcerate. The leprosy vesicles now become abundant, and the most urgent symptoms manifest themselves; the animal drags itself feebly about with a tottering step, it loses all relish for food, the inside of the lips are pale, there are numerous vesicles under the hot, swollen, slime-covered tongue, and often violet spots appear about the inside of the mouth; the eyes are dull, the pulse is feeble, the bristles fall off, the skin ulcerates away in patches, large tumours are developed, the body exhales a disgusting odour, and the breath is fetid. Now comes the last stage; the debility begins to be extreme, the posterior quarters become paralysed, the animal utters moans, and gradually sinks a mass of corruption.

In the latter stages of this complaint cure is hopeless. What is to be done must be done at the commencement. Cleanliness and comfort must first be attended to, and the diet should be cooling, simple, and in moderate quantity; a moderate portion of blood may be taken away, and doses of sulphur, Cæthiops mineral, and nitre, may be given daily, and occasionally a gentle aperient with a little ginger. The skin should be well washed with soap and water, and afterwards with equal parts of lime water and infusion of tobacco, or anointed with the following unguent:—Flowers of sulphur $\frac{1}{2}$ lb., common turpentine 1 oz., mercurial ointment $\frac{1}{2}$ oz., linseed oil $\frac{1}{2}$ pint. The ulcers may be washed with a solution of chloride of lime.

MEASLES.

The cause of this disease in swine is obscure; some regard it as an epidemic, very similar to the disorder called by the same name in the human subject, while others consider it as a milder form of leprosy, and certainly not without some good

grounds; it requires treatment as a cutaneous disease, which measles in the human subject does not.

Measles in the pig appears in the form of a subcutaneous affection, and consists in a vast number of small watery pustules below the outer sward or skin, and indeed generally scattered throughout the cellular tissue. On the surface of the skin appear numerous raised reddish patches, at first on the more tender parts, as the inside of the thighs, the flanks, and under parts of the fore arm. These gradually spread and become more or less universal. In the meantime the animal becomes feverish and sickly, loses its appetite, and is dull and feeble, especially in its hinder limbs; there is a discharge of mucus from the nostrils, a frequent cough, and a swelling of the eyelids; dark pustules are found under the tongue, and ultimately the surface of the skin desquamates.

The cure of measles, common as the disease is, is by no means very easy. Cleanliness and attention to diet are requisite; and half a drachm or a drachm of sulphur, with a scruple or half a drachm of nitre, may be given three times a-day in gruel or mash at the usual feeding hours; generally by perseverance this mode of treatment will ultimately prove successful.

The flesh of pigs affected with the measles, or with leprosy, is pale, flabby, insipid, and, what is more, positively unwholesome.

MANGE.

Mange in the pig is analogous to *itch* in the human subject, or the *scab* in sheep; it is a pustular cutaneous affection, arising from the burrowing ravages of a minute insect (*acarus*), as we have already stated in our notice of the diseases of the ox and the sheep, and requires the same treatment as we have already detailed. Cooling medicine, and the application of sulphur ointment, with a little mercurial ointment, diluted with a sufficient quantity of linseed oil, will generally effect a cure; some employ a lotion of weak tobacco water. A lotion consisting of a decoction of soot in water (the fluid after decoction being strained from the soot), and used when cold as a lotion two or three times a-day, is said to be efficacious. The great preventives are cleanliness, good food, and air. When pigs are infested with lice, as they are apt to be when kept in dirty sties in which there is no ventilation nor any comfort, the ointment above named, or the infusion of tobacco will prove a remedy, conjoined with a good washing, and a change to a clean abode. A little mild aperient medicine may be advisable. On these points, however, the less may be said, as we have already fully adverted to them in the history of the 'Ox' and the 'Sheep.'

THE TREATMENT OF THE SOW DURING PREGNANCY.

On this subject little need be said. A pregnant sow should be fed neither too luxuriously

nor too niggardly. Good condition is requisite, for she will have to nourish a numerous litter, but at the same time her strength must be kept up, and an extra allowance of nutritive food granted, especially when she has produced her brood. Some weeks before parturition she should have her own allotted sty, or shed, according to the farmer's convenience. As the time of parturition approaches she should be watched but not disturbed. Her bed and all around her should be scrupulously clean, and her hours should pass in undisturbed tranquillity. Abortion in the case of the sow is of rare occurrence, unless indeed she has been the subject of foul ill-usage. And now the day of her parturition is instant. Does all go on well? if so, wait the termination. Some recommend that the young ones as soon as born should be removed from the mother, kept in some warm spot, and not returned to her, until all is over, and the placenta has been passed away. This is all nonsense. Who removes the young of the wild sow? Yet we are gravely told, "that young sows especially will *invariably* devour the after-birth if permitted; and then the young, they being wet with a similar fluid and smelling the same." If this be true, how the *pig-population* of the world has been maintained we cannot tell. On this subject, to which we have already adverted, it is useless to waste words. *Let Nature have her free course; let not instincts be curbed and thwarted.*

There are occasionally cases of parturition in which surgical aid is required. Let the veterinarian be immediately called in. The anatomy of the uterus of the sow, with its double *cornua*, the conformation of the pelvic bones, and other points which we need not here specify, render it necessary to call in scientific assistance. In the *Veterinarian* (vol. xiii.) a successful case in which the Cæsarian operation was performed is recorded. Mr. Cartwright, V. S. was the daring and skilful operator. Happily the necessity for such operations is of rare occurrence, nor ought a procedure so hazardous to be undertaken rashly.

It is a remarkable fact that sows more frequently produce monsters of deformity, than do any other of our domestic animals. Several of these have, at different times, come under our personal inspection; and of many others we have heard and read. On this subject we have no theory to propound, and we confess our ignorance of the influential causes operating in the production of such abnormal objects; neither is it easy to say to which parent the defect is owing. The

safest plan is to breed no more from a sow who has once produced monstrosities, and to adopt another male; indeed among the progeny of some boars by different sows, one or more specimens of monstrosity, either from superabundance of members or deficiency, have been found in every litter. When this fact is clear, the boar should be castrated, and fattened for the butcher.

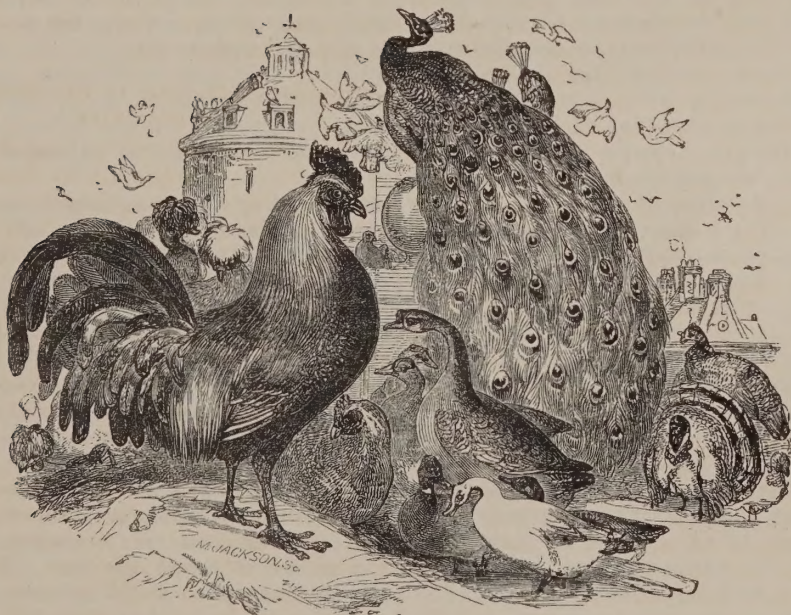
So far then have we given a history of the domestic hog, not excluding an account of its wild relatives, and more particularly of the common wild boar, the progenitor of our domestic stock. And here we shall close. We pretend not to be initiated into the mysteries of pickling pork, or of curing hams or sides of bacon. Some little variation in the process occurs in almost every county, and also in various countries, and many farmers follow plans of their own. Saltpetre, bay-salt, and common salt, with or without sugar or treacle, form the preparation for curing bacon and hams. In some places the smoking system is adopted, in others not.

MEDICINES EMPLOYED IN THE TREATMENT OF THE SWINE.

In our history of the 'Ox' and of the 'Sheep,' we have entered somewhat in detail as to the nature of the different classes of medicines employed in the cure of the distempers of those animals. We need not here go over the ground again. Few medicines are requisite in the treatment of swine. Of these the chief are common salt, Epsom salts (dose, from $\frac{1}{2}$ oz. to 2 oz.), sulphur (dose, $\frac{1}{2}$ oz. to $1\frac{1}{2}$ oz.), useful as the basis of ointments for cutaneous diseases. Nitrate of potass (dose, 1 scruple to 1 drachm), ginger (dose, from 1 scruple to 1 drachm), croton-oil (dose, from 1 to 3 drops), castor-oil (dose, from $\frac{1}{2}$ oz. to 2 oz.), jalap (dose, 1 scruple to $\frac{1}{2}$ drachm). Besides these we may mention oil, mercurial ointment, and turpentine, as ingredients in ointments, mixed with sulphur, for cutaneous affections. Turpentine, it may be observed, is useful in cases of worms, it may be given in doses of about half an ounce or more in gruel.

We have omitted all notice of accidental wounds or bruises, but on these points we have nothing to add to what we have already stated in the history of the 'Ox' and of the 'Sheep.' Stimulating embrocations will consist of turpentine, hartshorn, and camphorated oil, as already directed; nor have we further observations to make relative to setons, poultices, or chloride of lime, &c. &c.

POULTRY.



BY W. C. L. MARTIN,

LATE ONE OF THE SCIENTIFIC OFFICERS OF THE ZOOLOGICAL SOCIETY
OF LONDON.

POULTRY.

CHAPTER I.

INTRODUCTORY OBSERVATIONS.—ON THE STRUCTURE AND HABITS OF GALLINACEOUS BIRDS.—THE CHARACTERS OF THE PHASIANIDÆ, AND THE ORIGIN OF THE DOMESTIC FOWL.

IT is not only from among the mammalia that man has selected certain species, over which he may be said to rule with despotic sway, inasmuch as he has reduced them to a state of bondage, and taught them obedience; it is not, we say, only from among the mammalia that man has called his humble bond-slaves. The feathered tribes have undergone his revision, and from among these also, such as he has deemed subservient to his interest, or even to his gratification, have been brought into subjection, carried with him in his wanderings, transplanted from clime to clime, and become more or less modified according to the manifold agencies of country, temperature, food, and general treatment to which they have been subjected.

The mammalia give to man three descriptions of animals, the utility of which are generally acknowledged:—1. Two species of *carnivora*—the dog and the cat, animals valuable for service alone, at least generally speaking, for though the dog may be eaten in Western Africa, in China, and in some of the South Sea Islands, still the dog—and the same observation applies to the cat—could not have obtained originally the notice of man as a food-giver; other qualities and not its flesh recommended it to man. We might here notice the ferret, and perhaps the ichneumon, but they hold a doubtful position; the latter is indeed not unfrequently kept tame in Egypt and Northern Africa, and the former is bred in captivity as an assistant to the warrener and the rat-catcher. These animals cannot be said to be fairly domesticated, they are not in ordinary employment, they look not up to man as their tutelary deity, and are rather under his constraint than his care or protection. We may say the same respecting the cheetah or hunting leopard, employed in the East for the chase or rather the surprisal of the antelope; for although under discipline, it is still to all intents and purposes a wild beast, to be feared even by its keepers. 2. Three species of the order *pachydermata*, viz., the hog, the horse, and the ass. Some would here include the elephant, but we cannot fairly regard this beast as one of our *domestic* quadrupeds; it seldom breeds in a state of captivity—it is a slave; every individual used by man was once a free denizen

of the forest, it was captured, it was trained, it was taught the execution of the duties required from it, and its place has to be supplied by another individual, captured and drilled like its predecessor. Its race is not subjugated; *individuals* only are subjected to the misfortune of slavery. 3. Seven species of the order *ruminantia*, viz., the ox, the buffalo, the camel, the Bactrian or two-humped camel, the sheep, the goat, and the llama.

To this list we might add two animals of the order *rodentia*, viz., the rabbit and the guinea-pig (*cavia cobiata*), only that we scarcely regard them as truly domestic. We acknowledge that they exhibit in colour and size, as well as in other particulars, those manifold varieties which result from treatment and culture, and that they breed freely in captivity. Nevertheless, our feeling is, that these animals, of which one, the guinea-pig, is originally from South America, are rather prisoners than subjects. They are tamed, it is true, as far as their nature will admit of education—and this is all that we can say. They display no intelligence nor attachment; their intellectual powers are at the lowest ratio; and they bear captivity with the utmost content, satisfied if their wants be attended to, but are otherwise indifferent to the hand that feeds them. If we allow these animals a place among our domestic races, we cannot refuse the same situation to the white mice exhibited by the Italian peasant boy, and which are bred in captivity, and live contented with their lot, manifesting at least as much intelligence as the tame rabbit or as the guinea-pig.

Looking at the quadrupeds which in strictness we should call domesticated, we find them valuable to man in two different senses—namely, for personal service, and as affording food. Some, as the ox, are useful both for personal service and for food. In all countries the ox is more or less employed as a beast of draught and burden. Of the value of its flesh, and of the importance of the milk of the cow, we need not speak. On the contrary, the sheep is valueless as respects personal service—it affords wool, and flesh, and milk. The hog affords its flesh and its bristles, the horse and ass their bodily labour only—at least in our country, if we except the fact that asses' milk is in request for invalids. In some countries, as

Tartary and South America, horse flesh is eaten; and in the former country the milk of the mare is converted into a liquor called *koumiss*, said to be agreeable to the taste; and from this again they obtain by distillation an ardent spirit, which they term *rack* or *racky*, from the name given to the spirit so extensively manufactured in the East Indies.—(*Trans. Royal Soc. Ed.*, vol. i., and *Clarke's Travels in Russia*.)

With respect to the dog, though its flesh was eaten in ancient times, and is so still in China and many parts of Africa, as well as in some of the South Sea Islands, its great value depends upon its capabilities, its intelligence, swiftness, courage, strength, powers of scent, and fidelity.

Now, if we turn from a brief survey of our domestic quadrupeds, to the feathered species which man has reclaimed, and which "gather round his hospitable door," we shall find that it is for the sake of their flesh and eggs, almost exclusively, that they are kept in a state of dependence. The peafowl, indeed, is regarded as an ornament to the pleasure-ground; and the summer duck and the mandarin teal are bred in captivity to add interest by their beauty to garden-ponds and sheets of water. Formerly in our island, and it may be so still, as it certainly is in many other countries, the game fowl was reared almost exclusively for the supply of the arena with determined combatants. These, however, are but trifling exceptions to a general rule. The utility of our domestic birds arises from the acceptableness of their flesh as food; and it happens that with this strong recommendation in their favour, they become easily reclaimed—they conform themselves, without losing their natural characteristics, to the circumstances in which man has placed them—they troop around their owner at his call, and wear the chains of subjection with easy indifference.

As from among the mammalia man captures individuals and trains them to his purpose, the elephant and the cheetah being examples, so from among the feathered tribes, some species afford him individuals of the powers and instincts of which he avails himself for his pleasure or profit. It is, however, only on individuals, and not on the race, that his labour of subjugation is exercised, and instead of modifying their instincts, he merely turns them to his advantage—as examples in point, we may mention various species of falcons and hawks, viz., the peregrine falcon, the merlin, the goshawk, the sparrow-hawk, &c., which are captured wild, reclaimed, and trained to the sport of the field, exercising their destructive propensities for his gratification; we may also adduce the cormorant, which was formerly employed in England and Holland, as it is still in China, for the purpose of taking fish. We allude to these birds simply to show the parallelism existing

between them and some quadrupeds, of the services of which, as it respects individuals captured and trained, man avails himself; but which have on that account no claim to a place among those to which the term *domestic* is in its legitimate sense applicable.

Our domestic birds are collectively termed Poultry; this word, it is true, applies more particularly to those of the gallinaceous order, but is generally taken, for convenience sake, in a more extended sense, and will embrace the pigeon, the duck, and the goose, as well as the common fowl, the guinea-fowl, and the peafowl.

While the origin of most of our domestic quadrupeds, as the ox, the sheep, the horse, and the dog, are involved in obscurity, no zoologist being able to point out the wild stock whence they sprung, the origin of most, we may say of all our species of domestic poultry, is satisfactorily ascertained; it is true that time, and treatment, climate, and the breeder's art, have tended to the production of various modifications, not only as to size, but also proportions and colour, and in some instances more so than in others (in the common fowl, and in the pigeon for example, more so than in the turkey-fowl or the duck), still these variations do not place the species in that mystery which enshrouds the dog, rendering every speculation as to its primeval source, vague and unsatisfactory.

If, however, as we believe, the origin of our species of domestic poultry is to be traced out with tolerable certainty, still the period in which and the circumstances under which their domestication was attempted and achieved are buried in oblivion. The triumphs of man over the organic kingdoms, whether animal or vegetable, have had no annalist; we can only form theories, and, after all, uncertainty hangs over every hypothesis. With respect to the domestic stocks of the feathered race, it is evident that they were reclaimed at different periods and in different countries, and the same observation will apply equally to the mammalia, for their original capture could have taken place only in the regions which they tenanted, and the localities for which they were organized. The sheep and the goat are adapted by nature for mountain chains, and in such chains through Europe, Asia, and North America, do wild species of the genera *capra* and *ovis* still exist.—*Farmer's Library*.—"The Sheep." The ox, on the contrary, is formed for the plain, where a rich vegetation supplies the needful food. The horse is apparently destined for a wide open country, hilly or undulating, over which the wild troops may wander, perhaps migratory, as is the wild ass of the Asiatic deserts. So also among birds; some haunt rocks, and breed in the clefts and fissures or on the ledges of the precipice, as

the rock-dove (*Columba livia*); others, as the peafowl and jungle fowl, frequent forests and jungles; while again others are aquatic in their habits, and haunt lakes, marshes, and rivers. It is not, then, by one tribe or race of people, or at one time, or in one country, that the subjugation of our domestic animals was effected; this indeed is evident when we consider that some are natives of India, others of Africa, and others again, as the turkey, of America.

As the human race spread, and as they made progress in the arts of life, and established permanent cities, so did they add to their stock of domesticated animals, which became more and more necessary to their welfare. So much, in fact, was the value of such possessions appreciated, that wealth was estimated by the number of sheep and goats, oxen, asses, and camels, over which an owner claimed exclusive right. It may, perhaps, be deemed somewhat strange that, while in the records of the patriarchal age we read much respecting these quadrupeds, and, at a later period, of the horse (*Genesis*, xlix., 17, and xlvii., 17), no definite mention of domestic poultry is made, nor any allusion to its use as food. We would not here be too positive, but we suspect that domestic poultry did not form any part of the live-stock of the patriarchs. They were nomadic in their habits, they lived in tents, moving from spot to spot, as pasturage and water invited, devoting their labours to their flocks and herds. A nomadic life is inconsistent with the rearing and breeding of domestic poultry; they require a permanent abode, a fixed settlement, with proper conveniences for their shelter and comfort, and a due supply of food and water. To an unsettled people, living in tents, and watering their cattle at wells sunk in the sands of the desert, from which the water was drawn up and poured into troughs, domestic birds such as the fowl or duck would have been an incumbrance rather than an advantage—that is to say, even if such domestic birds were within their means of attainment, but this we think was not the case—the common fowl and the peafowl are of Indian origin, and we hear nothing respecting them till a comparatively recent epoch. In the book of Job (B.C. 1520) we have a description of the war-horse, and an allusion to the “goodly wings” or plumes of the peacock; but, as this bird is in the same verse associated with the ostrich, we may suppose that it was not reclaimed, and was probably known from its feathers only, which might have found their way from a far distant country, into the land of Uz, or Edom, at a time in which the horse had been reclaimed, and the Israelites were under Egyptian bondage. But a query here arises—Is the peacock the bird intended? We suspect not. The passage is confessedly one of great difficulty, and

the parallel appears to be drawn between the powerfully winged stork, sedulous in the care of her young, and the plume-winged ostrich, which trusts her eggs to the warm sand of the desert, forgetting that the foot may crush them.—See note in the *Pictorial Bible* to Job xxxix., 13.

In the 15th chapter of *Genesis* (ver. 10) we read among the animals commanded to be offered up in sacrifice of the turtle-dove and young pigeon, or some young bird of the dove kind. But we have no authority for supposing that a tame pigeon was intended, although it is evident that at a subsequent period pigeons were kept in proper buildings in vast numbers. The wild rock-pigeon (*Columba livia*) is spread throughout Europe, Asia, and North Africa, everywhere frequenting rocks and precipices, and the interior of caverns bordering the sea. Hence the appropriateness of the language of Jeremiah, “O ye that dwell in Moab, leave the cities and dwell in the rock, and be like the dove that maketh her nest in the sides of the hole’s mouth” (xlviii. 28). Yet the pigeon was at this time domesticated, as is evident from an expression in Isaiah, “Who are these that fly as a cloud, and as the doves to their windows?” (x., 8.) This text has been well illustrated by Morier in his *Second Journey*, p. 140:—“In the environs of the city (Ispahan), to the westward of Zainderood, are many pigeon-houses, erected at a distance from habitations for the purpose of collecting pigeons’ dung for manure. They are large round towers, rather broader at the bottom than the top, and crowned by conical spiracles through which the pigeons descend. Their interior resembles a honeycomb pierced with a thousand holes, each of which forms a snug retreat for a nest. More care appears to have been bestowed upon their outside than upon that of the generality of dwelling-houses, for they are painted and ornamented. The extraordinary flights of pigeons which I have seen upon one of these buildings afford perhaps a good illustration of the passage in Isaiah (lx. 8). Their great numbers and the compactness of their mass literally looked like a cloud at a distance, and obscured the sun in their passage.” “What gives addition value to this illustration is the probability that similar dove houses were in use among the Hebrews; for they certainly were so among their Egyptian neighbours, as we see by the ancient paintings and in the mosaic pavement at Præneste, where the dove-cotes are such large and round towers as Morier describes, decreasing in diameter upwards, but they are without the conical spiracles which we find in those of Persia.” In the copy of the pavement of Præneste, we observe ducks, geese, and other aquatic birds apparently tame, but not the common fowl; nor do we find it either sculptured or painted on the remains of art of the ancient

Egyptians, which present us with the duck and goose in abundance, birds which there is some reason to suspect were prohibited as food under the Levitical dispensation. Among the birds regarded as clean or unclean, under that law, the common fowl is not mentioned. Yet in the time of Solomon domestic poultry of some kind were kept, for in the First Book of Kings, iv., 23, we read, that the daily consumption of live-stock in the palace consisted of "ten fat oxen, and twenty oxen out of the pastures, and a hundred sheep, beside harts and roebucks, and fallow deer, and *fatted fowl*." It would be hazardous to assert that in the expression of "fatted fowl" the common domestic fowl was included; yet if Solomon received peacocks, which are natives of the East Indies, it might have been. But it may be asked, were the birds procured for Solomon peacocks, or as Buxtorff conjectures parrots (*psittaci*)? The question turns on the country to which the navy of Tarshish sailed, its outgoing and return occupying three years. It would appear that Solomon, assisted by Hiram, king of Tyre, built a navy of ships at Ezion-geber, on the shore of the Red Sea, in the land of Edom. This fleet was destined for Ophir, whence it brought back gold, algum-trees, and precious stones. Some suppose Ophir to be India (1 Kings, ix., 26, et subseq.); subsequently we are told (Ibid., x., 22) that "the king had at sea a navy of Tarshish with the navy of Hiram; once in three years came the navy of Tarshish, bringing gold and silver, ivory and apes, and peacocks." Now Tarshish is generally regarded as a maritime town in ancient Spain, visited by the early Phœnician voyagers for the purpose of traffic. From such country, however, neither gold nor silver, nor apes, nor peacocks could have been procured. However, it does not say in the verse quoted that the ships of Tarshish built in the Red Sea were destined for Tarshish, a voyage involving the circumnavigation of Africa; and hence it has been suggested that the expression "ships of Tarshish" means only large vessels fit for long voyages, and unlike the ordinary coasting vessels of the time. In confirmation of this view, we read (1 Kings, xxii. 48) that Jehoshaphat made ships of Tarshish to go to Ophir for gold, but they went not; for the ships were broken at Ezion-geber." But here a difficulty apparently insurmountable arises, for in the 2nd Book of Chronicles another account of both these transactions is given, which nullifies the previous theory. "For the king's (*i. e.* Solomon's) ships went to Tarshish with the servants of Hiram; every three years once came the ships of Tarshish, bringing gold and silver, ivory and apes, and peacocks" (ix. 21); and again, "He (Jehosaphat) joined himself with him (the then king of Israel, Ahaziah) to make ships to go to Tarshish; and they made

the ships in Ezion-geber, and the ships were broken that they were not able to go to Tarshish" (xx., 36, 37).

Now whether Ophir and Tarshish were two different places or not, whether Ophir was touched at during the voyage to Tarshish or not, certain it is that from Tarshish were brought ivory, and gold, and peacocks. All idea, therefore, of Tartessus in Spain must of course fall to the ground. Ivory and peacocks could not be obtained there, nor could a fleet get there from the Red Sea, unless by coasting round Africa.

With respect to Ophir, some, as we have said, place it in India, or regard it even as identical with Ceylon; others, as some portion of the southwest coast of Arabia; and others again, some portion of Eastern Africa, Sofala being among the districts contended for; here it is acknowledged might have been obtained gold and silver, and ivory, and also apes, but not peacocks. John dos Sanctos (see *Purchas his Pilgrims*), describing Sofala, speaks of the abundance of gold, silver, and ivory there to be obtained, as well as ebony and other precious wood, gems, &c. "As for peacocks (he says) I saw none there, but there must needs be some within land, for I have seen some Caffres wear their plumes on their heads." If peacocks existed in Sofala in the time of John dos Sanctos, they were probably introduced there by the Portuguese, who had a settlement at Inhamban, and at other spots, established about the middle of the sixteenth century, which still linger.

The common domestic animals (of course introduced) are found in Senna and Sofala (see art. Senna and Sofala in *Penny Cyclop.*) We do not say that either Ophir or Tarshish are to be looked for in Sofala, but we lean to the idea that they existed as districts or towns on some part of the coast of Eastern Africa—first, because of the character of the articles obtained; and secondly, because a coasting voyage was best adapted for even the largest ships of antiquity; and thirdly, because a voyage to India, say Ceylon, from a port in the north of the Red Sea, through the Isthmus of Suez and across the Arabian Sea, without a knowledge of the compass, must have been one of no ordinary difficulty. That the Phœnicians and Tyrians navigated the Mediterranean, traded with Spain, and even imported tin from our British shores, we may readily admit; we will admit that they explored the African coast to a great extent, but we hesitate to believe, as Herodotus was informed, that the Phœnicians actually circumnavigated Africa, sailing from the Red Sea, doubling the Cape, and returning by the Mediterranean, under the orders of Pharaoh Necho (king of Egypt).^{*} Still less can we give credit to the

^{*} Melpomene. This voyage occurred 400 years later than the time of Solomon.

theory that in the time of Solomon the ships of Hiram visited Ceylon.

Dr. J. Kitto, after a long and very critical analysis of the opinions which have been hazarded by the learned respecting Ophir and Tarshish, thus sums up the matter:—"The reader will by this time begin perhaps to question whether any particular places are denoted by the words Tarshish and Ophir. In the note to ch. ix. (2 Chron.) we explained that 'ships of Tarshish' were probably so called from being, like those which went from Phœnicia to the Atlantic, especially adapted to a long voyage. Now, by an obvious transition of ideas among a people whose notions of distant places were very indefinite, when ships that made long voyages were called ships of Tarshish, the name may in process of time have been transferred so as to denote any distant country to which such ships went. This would adequately explain how it happens that the ships which went to Ophir are called ships of Tarshish in the Book of Kings, but in the later Book of Chronicles are not so called, but are said to have gone to Tarshish, that is, went on a distant voyage. This explanation does not rest on our authority; it is the explanation of Gesenius. Heeren applies a somewhat similar explanation to Ophir. He says, 'It is very probable that this name, like those of Thule and others, did not designate any fixed place, but simply a certain region of the world, like the names East or West Indies in modern geography. Thus Ophir may be understood as a general name for the rich south country, including the shores of Arabia, Africa, and India.' In confirmation of this he observes elsewhere, after Tychsen, that the word Ophir signifies in Arabic the rich countries. In these explanations, as respecting the names of Tarshish and Ophir, we entirely acquiesce. They enable us to conclude that the fleet may have gone trading to various places, collecting the different commodities which were required, and relieve us from the necessity of finding everything in one place."

It appears to us that this explanation is like cutting the Gordian knot, instead of untying it. We cannot imagine that Ophir or Tarshish meant, indiscriminately, the shores of Arabia, Africa, and India. Nor do we think that India was visited at that early period by the united fleets of Solomon and Hiram. Consequently we lean to the idea that either parrots, or some other birds, perhaps guinea-fowl, were the birds in question. It is somewhat strange, if peacocks were possessed by Solomon, that they were not known at a remote period to the Greeks. It is true we do not know at what period the peacock was introduced into Greece, but at all events it must have been before the time of Alexander. "Certain it is that the

peacock is mentioned in two plays of Aristophanes, the 'Acharnians' and the 'Birds,' the first of which was represented in the third year of the 88th Olympiad, and the last in the second year of the 91st. Now, Alexander was not born till the second year of the 98th Olympiad. Athenæus quotes from other old poets—Eupolis, for instance; nor does Aristotle speak of the bird in any other terms than those which would indicate that it had become very well known when he wrote. 'Some are jealous and vain, like the peacock,' says Aristotle, when speaking of the qualities exhibited by certain animals."—(*Hist. Anim.* i.)

After all, we leave the point in obscurity. It is however at least probable, that if Solomon introduced the peacock in his ships from some part of India, the common fowl might have been imported by the same means, and, though not expressly mentioned, have in his days begun to spread over Western Asia, and thence throughout the warmer and temperate parts of Europe, which it has so long tenanted. That neither of these birds were common in ancient Egypt (where the fowl is now multiplied by artificial incubation) would appear from its absence among the paintings and sculptures of remote days; while the figures of domestic waterfowl are abundant, among which the chenalope or Egyptian goose, the common goose, and the duck are observable. Herodotus informs us, that the Egyptians eat not only fish, both pickled and dried in the sun, but also quails, ducks, and other small birds, preserved in salt without any other preparation; and in the British Museum, among dried fruits, bread, and other articles of food, found in the tomb of an ancient Egyptian, is a small water-bird, apparently a duck of some species, which appears to have undergone some preparation so as to have prevented its decay. That these birds were well known in a domestic state to the Israelites during the time of their captivity cannot be doubted; but it does not appear that they brought any such with them on their exodus, and perhaps regarded them with aversion, although the quail was acceptable. It must be remembered that a prohibition was issued against multiplying horses, which would lead to an intercourse with Egypt—(*Deut.* xvii. 16)—a prohibition afterwards neglected, but which serves to show that the domestic animals of Egypt were not regarded by the Israelitish rulers with favour; nor can we wonder at it, when so many of them were deified.

Thus, then, it would seem that all attempts, beyond a certain point, to trace back the history of some of our most common domestic poultry, are in vain. The circumstances attending their primeval subjugation are utterly buried in oblivion; nor can we follow them from their native seats, detailing their progress and general diffusion—a

point the less to be wondered at when the history of the turkey, a bird introduced from America into Europe, somewhere about the beginning of the sixteenth century, is involved in doubt and difficulty. The same obscurity, then, which hangs over the early history of our domestic quadrupeds, hangs over that of our domestic birds, nor can we hope ever to dissipate it.

From these brief preliminary observations, which serve rather to show the limitation than the extent of our knowledge, we may advance to the main subject before us.

Our domestic poultry belong respectively to three distinct orders of the class *Aves*—viz., the rasorial or gallinaceous order, the columbine or gyratorial order, and the natatorial or swimming order. These orders are distinguished from each other by well-marked characters, which are exhibited as much by the domestic as by the wild species included in them. Each order, however, is universally distributed, no country being without some representatives; and these are collected into families, according to their mutual affinities. In the execution of our plan, we ought, perhaps, in due strictness, to take the columbine order (*gyratores*, Nobis; *gyrantes*, Bonap.) first into consideration, as it is generally regarded as intervening between the passerine order (*insessores*, Vigers) and the true gallinaceous order. This intervention is, as it appears to us, rather assumed than demonstrated. We know not to what tribe or family of the *insessores* the pigeons are allied; while, on the other hand, we acknowledge that through some forms, and especially the crowned pigeons (*lophyrus*) of the Moluccas and New Guinea, the columbine order approximates to the order *rasores*. Nevertheless, granting that the situation attributed to the columbine order (the family *columbidæ* of some authors) is correct, still as it yields, so far as utility to man is concerned, to the gallinaceous or rasorial order, we shall commence with the latter, giving, at the outset, a brief sketch of its leading characters.

ORDER RASORES.

As the term *Rasores* (*rado*, scratch) leads us naturally to conclude, the birds included in this order are chiefly if not exclusively terrestrial in their habits—many indeed roost, for they can hardly be said to perch, on trees; but some, as the partridge, the quail, the red grouse, and others, are absolutely terrestrial, not only scratching for their food, but reposing on the ground. The habits of all animals and their organization and external configuration, nay even their clothing, are in accordance with each other. In birds which make the ground their province, and emulate neither the dove, the pratincole (*Glareola torquata*), the stone curlew (*Edicnemus crepitans*), nor

the lapwing* (*Vanellus cristatus*), in flight, we cannot look for much strength of wing, but we may expect to find the legs well developed, and the thighs muscular. The *rasores* have in fact a rounded heavy body, covered with loose plumage, which in many instances assumes on the neck or rump the character of plumes, or hackles, and the tail feathers are often singularly developed. The hackles on the neck of the domestic cock, the gorgeous plume of the peacock (its rump feathers), and the elongated tail-feathers of the pheasant, and others of the genus *phasianus*, are examples in point. The wings, as a rule, are short, rounded, and concave underneath, the quill feathers are feeble, and the *os furcatum*, or merrythought, a bone which acts like the clavicles in the human subject, supporting the shoulders during the exertion of the pectoral muscles, is weak and undeveloped. It is peculiarly so in the turkey. In some rasorial birds, however, as the grouse, ptarmigan, &c., the wings though short and concave, have much firmer quill-feathers, and the *os furcatum* is more developed. These birds fly for comparatively short distances with great rapidity, but they also run with ease and celerity on the ground.

As organs of progression, the legs of the *rasores* take a far higher rank than the wings. The rounded full-made body is nicely balanced upon them; the thighs are powerful, the tendons of the muscles inclining to become osseous; the tarsi or shanks are long and stout, and covered anteriorly with broad hard scales; in the males of many species they are armed with a horny spur, and in some with a double spur; rudiments of the spur are apparent in the tarsi of the females, and occasionally these weapons become considerably developed; the toes are three before, united at their base by a short membrane, and a short posterior toe seated high up on the tarsus—little more than its tip touching the ground during progression: the toes are covered above with broad scales, but beneath the tough skin is protected by hard granulations; they are furnished at the extremity with strong blunt nails or claws, convex above, concave beneath, and well adapted for scraping up the ground in quest of seeds, roots, and insects. The toes have but a feeble power of grasping. While perching, the weight of the body acting on the contractor tendons of the toes, closes them sufficiently for giving a tolerably secure hold, especially as the body is well balanced;† still the

* The stone curlew, lapwing, and others of the grallatorial order, as the snipe, woodcock, &c., obtain their food on the ground, affecting marshy situations, where they breed and repose, but in all other respects they are remote from the *rasores*.

† For an account of the peculiarity in the arrangement of the tendons of the leg, in birds, whereby their security in perching is affected, see the *Pictorial Museum of Animated Nature*, vol. i. p. 283, col. 1.

hold is destitute of that tenacity which in many other birds is so remarkable.

In looking at the head of the Rasorial Birds, we find the beak stout, of moderate length, with the upper mandible convex above, the nostrils being pierced in a large membranous space on each side at its base. In many species the head is furnished with naked membranes in the form of a comb, and wattles or naked skin on the cheeks or around or over the eyes, or naked carunculated appendages on the head, and extending down the anterior part of the neck; in some the base of the beak is surrounded by a naked membrane—in others the head is crested with feathers or even galeated with an osseous helmet. In most the trachea is simple, but in the curassows it is more or less convoluted. The voice is generally harsh or perhaps discordant, never musical, unless the cock's "shrill clarion" may be so denominated. The scream of the peacock, the gobble of the turkey, and the harsh grating voice of the guinea-fowl, are familiar sounds to all. The sternum or breast bone is deeply notched or indented on each side of its posterior edge, and the ribs are feeble.

As respects the senses, those of sight and hearing are tolerably acute; but smell and taste do not seem to be at a high ratio, nor indeed is it needful that they should be so. Grains, seeds of various kinds, mast, bulbous roots, berries, the sprouting leaves of vegetables, together with worms, insects, and their larvæ, constitute the food of this group of birds. The young, indeed, feed largely on the larvæ of ants, and on insects generally, picking them up with avidity.

A few observations on the digestive organs of the rasorial or gallinaceous group of birds, may be here admissible; and the rather as these parts ought to be understood by all who keep poultry, and who have their assistance frequently called into operation when fowls, as is their habit, over-distend the crop with grain. The œsophagus or gullet leads into a dilatation called the crop, craw, or *ingluvies*—a large membranous cavity, which lies just before the breast bone, and which receives the food when first swallowed. It is furnished with many mucous and salivary glands, the exudation from which tends to soften the grain, and fit it for farther elaboration. This crop or sack is not very sensible, and when gorged with food may be opened by means of a sharp pen-knife or lancet, and relieved of its contents. If the edges of the wound be neatly joined together, and secured by a few stitches—the bird being at first kept fasting, and afterwards only allowed a little sopped bread or the like—it will generally recover without any ill symptoms. To this crop succeeds a narrower portion, called *ventriculus succenturiatus*, the lining membrane of

which is beset with numerous glandular orifices, forming a sort of belt, which pour out a copious secretion of digesting or gastric juice, which mingles with the food in the gizzard or grinding stomach, into which the *ventriculus succenturiatus* immediately leads. The gizzard is a powerful grinding mill, composed of immensely thick and firm muscles, and lined with a tough insensible coriaceous membrane. The two massive hemispherical muscles which essentially form the grinding apparatus are opposed face to face, like two millstones, and they work upon each other, triturating to a pulp the food subjected to their action, and rendering it fit, after being broken down, for the influence of the gastric juice, which, until this takes place, in the case of grain, would have little or no solvent power upon it. To assist in this mill-like operation of the gizzard granivorous fowls swallow small pebbles or stones—a practice clearly instinctive, and sometimes carried to a greater extent by domestic fowls than would seem necessary. Nevertheless, without a sufficiency of these pebbles (and fowls should never be so kept as to be unable to obtain them), digestion is suspended, the body derives no nutriment from the food (unless indeed it be pultaceous), and the bird droops and wastes away. Sir Everard Home, in his description of the gizzard of the turkey, says, "When the external form of this organ is first attentively examined, viewing that side which is anterior in the living bird, and on which the two bellies of the muscle and middle are more distinct, there being no other part to obstruct the view, the belly of the muscle on the left side is seen to be larger than on the right. This appears, on reflection, to be of great advantage in producing the necessary motion; for if the two muscles were of equal strength, they must keep up a greater degree of exertion than is necessary—while in the present case, the principal effect is produced by that of the left side, and a smaller force is used by that on the right to bring the parts back again.

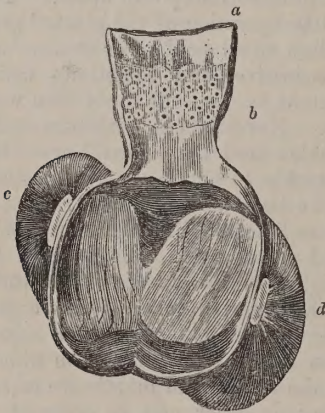
"The two bellies of the muscle, by their alternate action, produce two effects,—the one, a constant friction on the contents of the cavity; the other, a pressure on them. This last arises from a swelling of the muscle inwards, which readily explains all the instances which have been given by Spallanzani and others of the force of the gizzard upon substances introduced into it—a force which is found by their experiments always to act in an oblique direction. The internal cavity, when opened in this distended state, is found to be of an oval form, the long diameter being in the line of the body; its capacity nearly equal to the size of a pullet's egg; and on the sides there are ridges in the horny coat (lining membrane) in the long direction of the oval.

"When the horny coat is examined in its

internal structure, the fibres of which it is formed are not found in a direction perpendicular to the ligamentous substance behind it; but in the upper portion of the cavity they have a direction obliquely upwards.

"From this form of cavity it is evident that no part of the sides are ever intended to be brought in contact, and that the food is triturated by being mixed with hard bodies and acted on by the powerful muscles which form the gizzard."—(*Comp. Ant.* i., 316.)

The annexed cut shows the gizzard of the turkey laid open: *a*, lower portion of the crop; *b*, ventriculus succenturiatus, with its zone of glands; *c*, muscle of the left side of the gizzard; *d*, muscle on the right side.



Cut of Gizzard of Turkey, laid open to show its Internal Structure. From Sir E. Home's *Comparative Anatomy*; also in *Faculties of Birds*, p. 117.

We shall not enter into details of the experiments, many of them unwarrantably cruel and unnecessary, which Spallanzani, Redi, Magalotti, and others have instituted, in order to test the grinding and solvent powers of the gizzard. Bullets beset with needles and lancets, jagged pieces of glass, and similar articles have been introduced into this viscus, and in a short time these sharp instruments have been found broken up, and the edges of the glass rounded and smooth, the lining membrane of the gizzard exhibiting no appearance of lesion. Felix Plater found that an onyx swallowed by a hen was diminished one-fourth in four days, and that a louis d'or lost in this way sixteen grains of its weight.

With respect to the intestinal canal, into the duodenal portion of which the food converted into a pultaceous mass passes from the gizzard, little need be said. There are two long cœcal appendages (very small or wanting in pigeons); the liver is furnished with a gall bladder (generally absent in the pigeon tribe), whence the bile is carried by ducts into the duodenum, into which

latter the secretion of the pancreas also is transmitted. The gallinaceous birds, as a general rule, are polygamous, each male having a harem over which he is the lord paramount. In the wild state, at the commencement of the breeding season, the males take possession respectively of certain beats from which they drive every rival, or from which they are driven by a more powerful antagonist; at this season their natural pugnacity is increased, and fierce combats are constantly taking place till the balance of power is established.

The males clap their wings, strut about with a stately measured pace, utter their notes of invitation to the females, and of defiance to all rivals. The care of rearing the young devolves entirely on the females, the males neither assist in making the nest, nor in the labour of incubation; on the contrary, in many cases the females assiduously conceal their nests from the male, lest he should destroy the eggs, which he regards with aversion. This is peculiarly exemplified in the turkey and peafowl. During the winter, the males (their mutual hostility having ceased) usually associate together, but separate in spring, when their warfare is renewed. In some respects the partridge is an exception to the general rule. The males and females pair in February, each male having only one mate. During this month obstinate contests occur between the males, the victor leading off his prize in triumph. Incubation is performed solely by the female; but she is not deserted by the male, and he unites with her in the care and protection of the brood as soon as it is hatched, and displays the utmost courage and anxiety in their behalf. On the contrary, the wild turkey-cock will kill the young if an opportunity falls in his way; and will break the eggs should he chance to discover them.

The nest of the females of the gallinaceous tribe is rude and inartificial. It is generally placed on the ground, under some covert, by way of concealment. Some of the curassows, however, build their nests on the branches of trees. The eggs are numerous; the young when hatched are covered with down, and after the lapse of an hour or two are capable of running about. They follow the female, to whose varied calls they show instinctive obedience, and gather for warmth and security under her wings. She leads them in search of insects and seeds, which they pick up, not requiring to be fed as do the unfledged nestlings of most birds. She defends them with a degree of boldness the more surprising as at other times she evinces a natural timidity; and it is only by degrees that her care and anxiety diminish, and ultimately vanish.

We may observe, while speaking generally respecting the habits of the gallinaceous group, that these birds dislike wet and swampy situa-

tions; indeed, severe rains are very fatal to young grouse and partridges, and a slight sprinkling will thin the young brood of the turkey. All must have observed how dull and drooping the common fowl becomes during the continuance of heavy rains; how under shelter

“— the household feathery people crowd,
The crested cock, with all his female train,
Pensive and dripping.”

The fact is, that their plumage does not well throw off the water. Their hackles become saturated, and their tail feathers drag in the mire. While, however, this openness of plumage renders it unfit to contend against water, it is expressly adapted for a cleansing operation which fowls are often seen to practise, and in which they greatly rejoice. They scratch and wallow in the dust, and throw it in profusion over their plumage, till every feather receives its share. They then rise, flutter their wings and feathers, so as to shake it off, and with it those minute parasitic insects to which all birds are more or less liable. They are fond of making dusting-places or excavations in dry sunny banks, composed of loose sandy earth, and there, while the mid-day rays are glowing, they will spend hours partly in indolence, partly in revelling in the sand-bath, and scattering its particles over them. This is a luxury to which fowls should always have access. It tends to their health, and to the preservation of their plumage in its native brilliancy. Pigeons, on the contrary, are fond of washing themselves in water, and are indifferent to rain. Sparrows both wash and dust their plumage.

Though the gallinaceous tribe obtain their food on the ground, and build their nests there also, most roost at night on trees, and are even fond of elevated situations. This is remarkable in the peafowl, turkey, and Guinea fowl, and we have known them refuse shelter during the cold nights of severe winters, preferring the exposed branches of trees or the tall gable of some barn or other outhouse. That they should be capable of enduring cold so intense is very surprising, but it proves their hardiness, and their fitness for extensive geographical distribution. Many gallinaceous birds, however, such as the partridge, the red grouse, the ptarmigan, &c., never settle on trees, but seek shelter on the ground, under tufts of herbage or brushwood, sometimes, as in the case of the ptarmigan (*lagopus mutus*), under the snow.

Family, *Phasianida*.

Genus, *Gallus*. Generic characters:—Bill moderate, strong, convex above, curved towards the point, naked at the base, and furnished with two compressed caruncles or wattles. Head surmounted

with a fleshy crest or comb. Tarsi in the male armed with a long and recurved spur, the hind toe only resting on the ground at its tip. Wings short and graduated. Tail-feathers fourteen, forming two vertical planes, with the under sides of the feathers towards each other, and so making what may be called a folded tail. The middle feathers longest, and recurved.

The COMMON FOWL (*Gallus domesticus*, Ray).—Varying in size, and subdivided into numerous breeds, the result of domestication, the common fowl is almost universally distributed. It has been long domesticated throughout Europe and Asia. It is kept in abundance by the natives of various parts of Africa, and it has been, within recent times, introduced into America, Australia, New Zealand, and other parts colonized by Europeans. M. Lesson asks if it is not remarkable that the domestic hen, differing in nothing from that of our countries, should be found in all the islands of the South Sea, and among people with whom Europeans have certainly never communicated? Cocks and hens, he tells us, were very common at Oualan, for example, and the natives were ignorant that these birds were good to eat. They were found in the Papuan islands, and, among others, there was a white variety, with all the feathers frizzled. We may easily suppose that these birds came with the early colonists, and were derived from Malaya, Sumatra, &c.

That the fowl was domesticated and extensively spread at a very remote period, is very evident; but, as we have said, it does not seem clear whether it was possessed by the Israelites before the consolidation of the nation under Solomon, when commerce began to flourish, and the arts of life to be strenuously cultivated. After the Babylonish captivity, we cannot doubt that the fowl was among the domestic animals of Palestine, and it is to this bird, most probably, that Nehemiah (B.C. 445) alludes, when in his rebuke he says, “Now that which was prepared for me daily was one ox, and six choice sheep, also *fowls* were prepared for me, and also once in ten days store of all sorts of wine” (v. 18). Antecedently to this period, the fowl was abundant in Persia. Thus Peisthæterus (Aristophanes, *Birds*, 483 *et seq.*) relates why the cock is called Περσικὸς ὄρνις (the Persian bird), and how it reigned over that country before Darius and Megabazus (B.C. 521). Not only do the classic poets and historians speak of the high antiquity of the fowl, but medals and coins proclaim the same, and bear its figure stamped upon them. Nor is its delineation absent on other relics of remote periods. In Campanini's *Etruscan Tombs*, we see several persons reclined on a sort of couch, taking wine and bread after the burial of some friend. Under one of the tables a cock and hen are depicted, and

under another a cat is seen insidiously creeping towards them.*

We may observe, *en passant*, that the cat was domesticated at an early period in Egypt; and, if we may trust an Egyptian painting in the British Museum, it was trained to assist the fowler in the capture of birds. Cats were deemed sacred, and buried in holy places. They were also often embalmed, and their bones have been observed in the catacombs of Abousir. Nevertheless, its representation does not appear to have been discovered among the Egyptian sculptures. Does the same observation apply to the fowl? We doubt it. Herodotus does not mention the fowl as among the domestic birds of Egypt, though he speaks of the goose, the vulpanser or *chenalopex*, the duck, the quail, small birds, and two sorts of ibis. (See Herod. *Euterpe*.)

Among the Greeks and Romans the fowl figured in the public shows. It was dedicated to Apollo, to Mercury, to Æsculapius, and to Mars; and its courage and watchfulness were well appreciated. The Rhodian fowls, and those of Delos, Chalcis, Media, and Persia, were celebrated for their superiority in fight, and for the excellence and delicacy of their flesh. Cock-fighting, as might be expected, was a diversion in consonance with the tastes of the Romans, and they were as much devoted to it as the Malays of the present day, who will stake all upon the issue of the battle. To the rearing of these birds for the table, the greatest attention was paid by the luxurious. They had their *gallinaria*, and were accustomed to cram their fowls with meal, and keep them in the dark that they might the more readily fatten; nor were the capon (*gallus spado*) and the poularde (*gallina spadonia*) unknown.

The Greek terms ἀλέκτωρ, or ἀλεκτρον, a cock, and ἀλεκτορίς, a hen, bear allusion to the watchfulness of the fowl and its matin crow—

"When the cock, with lively din,
Scatters the rear of darkness thin."

Milton.

The words are derived from α, priv. and λεκτρον, a bed; and, therefore, lead us to infer that no

native or foreign name was transported into Greece with the fowl, otherwise it would most probably have been retained in a modified form. The origin of the words *gallus* and *gallina* is not very evident. Though the allusions to the fowl in the Old Scriptures are few and unsatisfactory, several most pertinent and striking references to it occur in the New Testament, so that it must have been established in Palestine long before the commencement of the Christian era. In the present day, indeed, more fowls are consumed there, in proportion to the population, than in any European country; and this observation applies equally to Western Asia in general, the fowl and the sheep affording the staple articles of animal diet.

When the Romans, under Julius Cæsar, invaded the shores of Britain, they found both the fowl and the goose in a state of domestication; but these, as well as the hare, were forbidden as food. "Leporem et gallinam, et anserem gustare fas non putant; hæc tamen alunt animi voluptatisque causa"—"They deem it not lawful to eat the hare, the fowl, and the goose; nevertheless, they breed these animals for the sake of fancy and pleasure." Through what channel, it may be asked, did the fowl reach this *ultima Thule*?—this island, which the Romans afterwards tenanted, but which previously to Cæsar's invasion, we may almost say discovery, was but little known to the then civilized world—that is, the Greek and Roman states. Was it introduced by the Phœnicians, that maritime nation of whose ships and seamen Solomon availed himself? Was it brought by the Celtic settlers? or by the Belgæ? or by some prior race whose annals have never been written? Or was it only introduced within a comparatively short period antecedent to the invasion of Julius Cæsar, when commerce with Gaul was established? and was its prohibition as an article of food intended as a means to promote its increase? We pretend not to answer such queries; there is a mystery in the proceedings connected with the spread of domestic animals in remote ages, which we cannot penetrate. Could we analyze the migrations of our own species from clime to clime; could we trace the progress of the human swarms which in the obscurity of time have successively advanced from various points, spreading as they have proceeded, sometimes mingling with other nations, sometimes driving the older occupiers of the land before them; could we develop the history of man, the relationship of race to race, and point out their original seats and starting-places, then might we be able to throw a clearer light on the history of our domestic animals; but the task has yet to be accomplished. Without dwelling on this point, let us look at the wild species of the genus *gallus*, and endeavour to

* Figures of the domestic fowl are carved in relief on the marbles lately brought from Lycia, in Asia Minor, by Sir C. Fellows, and their outlines are remarkable for accuracy.

The following note from our friend Mr. Waterhouse, dated British Museum, is interesting, as it strengthens us in our opinion respecting the non-possession of the fowl by the ancient Egyptians:—"I have made inquiries, and have learned that the fowl does not occur on their monuments, and that it was unknown to the Egyptians; moreover, that it is supposed to have been first introduced from India by the Persians under Cambyzes. It appears at a very early period on some of the Greek coins." Cambyzes reigned B.C. 529-24. He was the son of Cyrus, B.C. 560-29. We cannot but believe the fowl to have been introduced to Persia before that date. However, as Persia first received this bird, it is natural that the Greeks should have given it the name of Περσικὸς ὄρνις.

ascertain if there be among them any which may be regarded as identical with the domestic strain.

It is to India, Malaya, Sumatra, Java, and perhaps other islands, that the wild species of the genus *gallus* are now restricted. How far to the west, in remote ages, some of these species may have spread, we know not; some may have been distributed from India through Persia, even to Mingrelia and Georgia, anciently Colchis, whence the Greeks derived the pheasant, which they found abundant on the banks of the Phasis (the modern Rion). Indeed the wild pheasant is said to be common in some parts of China and Tartary, as well as in Mingrelia; and if so, its distribution from east to west is very extensive.*

But be this as it may, we are sure that many animals were once diffused more widely than they are at present—witness the lion, now found only in Africa, India, and some parts of Persia and Arabia, but which once existed in Palestine, Thrace, Macedonia, and Thessaly. The old world species of beaver was once indigenous in England and the adjacent parts of the continent, and it still occurs along some of the rivers of Europe, as the Rhone, the Danube, the Weser, and the Nuthe. It abounds on the Obi, and is common on the Euphrates. The aurochs, which once roamed the forests of Pæonia, and of middle and western Europe, including Britain, is now confined to a forest in Lithuania, as far as Europe is concerned, and in Asia tenants the wooded fastnesses of the Caucasian range. We might enlarge our list, but we have said enough to show that from one cause or another the geographic range of many animals has been circumscribed, and so it might have been as it respects some of the species of the genus *gallus*, which now find a restricted home in the dense jungles and woods of India, having lost it in Persia and Media. We say this is possible, but we do not insist upon it, for we have no data by which to substantiate it, unless we lay a greater stress upon the term *Περσικὸς ὄρνις* than it will fairly warrant. Let us however proceed to enumerate the principal species of the genus *gallus*.

1. THE GREAT MALAY, COCHIN-CHINESE, OR

KULM FOWL (*Gallus giganteus*, Temminck).—This gigantic species, more remarkable for stature than for beauty or gracefulness, is a native of Java, Sumatra, and perhaps the Malay peninsula. The male, in his natural attitude, often considerably exceeds two feet in height, from the ground to the crown of the head. The comb extends backwards in a line with the eyes; it is low, thick, destitute of serrations, and has the appearance as if its ridge had been cut off. The wattles hanging from the under mandible are small, and the throat is bare. The neck is long, and covered with hackles of a pale golden reddish colour, which extend to the upper part of the back. The middle of the back and the lesser wing coverts are of a deep chestnut, and the webs of the feathers are disunited; the greater wing coverts are glossy green; the secondaries and quill-feathers are of a pale reddish yellow on their outer webs. The hackles of the rump are long and drooping, and are of a pale reddish yellow. The tail feathers are of a glossy green. The under parts generally are of a glossy greenish black, with high reflections, each feather being of a deep chestnut at the base, producing somewhat of a mottled appearance, especially if the plumage be a little deranged. The body is stout, and the legs are long, but very robust. In proportion to the size of the body, and length of the neck and limbs, the head seems small, and is far from being pleasing in appearance, the curtailment of the comb and wattles seeming the result of injury or malformation. The gait is heavy and destitute of alertness, and the bird, as we have frequently seen, often reposes resting on the tarsi or shanks, their whole length being applied to the ground. The emeu rests in the same manner. The attitude is uncouth, and gives the idea of the bird being oppressed with its own weight. It is very probable that this gigantic fowl (sometimes, we believe, called the Chittagong fowl) is less disposed to mount the trees and roost on the branches than most others of the genus; and this strange attitude may be the ordinary mode of taking repose. The crow of the cock, instead of being a clear ringing tone, heartily delivered, as if in defiance of every rival, like the blast of the knight's clarion on the listed field, is short, hoarse, and monotonous, more like a croak than a crow. Yet, we believe, the bird is game, and that it is matched in India with others in the arena. The female is considerably less than the male, awkward in figure, and of a general brownish colour. Some persons regard this bird with admiration, and see something grand and striking in its appearance. If grandeur and beauty consist in size, they are right; but if they look for animation, alertness, a proud bearing, a light and vigorous step, and an elegant contour,

* In the late Chinese Exhibition specimens of the ring-necked pheasant were among the birds of the collection. This is the *Phasianus torquatus* of Gmelin. Respecting the specimens in question Mr. H. E. Strickland says, "This is the true wild ring-necked pheasant, indigenous to China. The ring-necked pheasants sometimes shot in this country are supposed to be a mixed breed between this species and *Ph. Colchicus*."—*Proceed. Zool. Soc.* 1842, p. 166. If the ring-necked pheasant be a distinct species from the ordinary pheasant without a ring of white round the neck, then we have an instance of a race fertile *inter se*, proceeding from two species. We, however, incline to the idea that they are mere varieties, and not truly distinct. Another allied species from China is the purple-breasted pheasant (*Phasianus pectoralis*). The rich colour of the throat extends over the whole breast. China is rich in splendid species of the genus *Phasianus*, as the gold and the silver pheasant, Reeves's pheasant, &c.

this bird will not meet their expectations. Crosses between this fowl and other breeds, where increase of size is desirable, might be advantageous. As to the fertility of the mixed stock no doubt can be entertained, and this fact, if the specific distinctness of the *gallus giganteus* be admitted, is sufficient to prove that closely-allied species may produce a stock capable of perpetuation.

Within the last few years, many of these gigantic fowls have been imported into our country, and are kept by the curious in fancy poultry. They have their admirers; and, though we cannot see with them, we blame not their taste. We suspect, however, that in many instances, in which the cocks show a slight serration of the ridge of the comb, that a cross has at some time taken place, to the improvement, in other respects, of this giant race; but on this point we cannot be certain.

This fowl has been long kept in various parts of India in a domestic condition, and is called by Europeans the kulm cock. In the *Proceeds. Zool. Soc.* 1832, p. 151, we find the following notice of this bird, which Colonel Sykes observed as common in Dukhun (Deccan):—

“Genus *gallus*, Brisson; *gallus giganteus*, Temm., Gall. Ind., 633.—Known by the name of the *kulm cock* by Europeans in India. Met with only as a domestic bird, and Col. Sykes has reason to believe that it is not a native of India, but has been introduced by the Mussulmans from Sumatra or Java. The *iris* of the real game bird should be whitish or straw yellow. Col. Sykes landed two cocks and a hen in England in June, 1831. They bore the winter well. The hen laid freely, and has reared two broods of chickens. The cock has not the shrill clear pipe of the domestic bird (the ordinary cock), and his scale of notes appears more limited. A cock in the possession of Col. Sykes stood twenty-six inches high to the crown of the head, but they attain a greater height. Length, from the tip of the bill to the insertion of the tail, twenty-three inches. Hen one-third smaller than the male. Shaw very justly describes the habit of the cock of resting, when tired, on the first joint of the leg.”

The specimens brought to England by Col. Sykes were the first we had ever an opportunity of examining. Other specimens have subsequently come under our notice, and we understand that this breed or species is kept in the royal aviary at Windsor. It has, however, been long known to naturalists, and was described nearly fifty years since by Shaw.

Here, then, we have one source at least whence some of our domestic stocks have been derived, among which we may here notice the St. Jago fowl of Marsden, so remarkable for height and weight. In this breed the comb, both of the cock and hen,

is large and often double, added to which there is sometimes a crest of feathers. Domestication always produces some modifications of structure in animals, and more especially in organs of minor importance, as in the length of the tail and ears, and in the development of various appendages. That the comb of the St. Jago fowl should be large, and often double, is not surprising. Most of our ordinary breeds have a rose crown, yet this development is never found in any wild species. It is the result of domestication, and occurs in a part most liable, as might be anticipated, to change. Of a like nature are the caruncles at the base of the beak, and the naked granular or wrinkled skin (the rose) round the eye of the horseman pigeon or carrier. If the carrier be crossed with any other breed, as the tumbler, the excessive development of the tumid skin at the base of the beak and around the eye will appear in the offspring, only not to so great a degree; and so, if a fowl with a single comb be crossed by one with a double or rose crown, this peculiarity will appear more or less constant in the mixed strain. The same observations apply to plumage. In the male of one wild species (*gallus Sonneratii*), the feathers of the neck and the shoulders have their shafts expanded into a thin horny plate, with a rich metallic gloss; and we hesitate not to say that, by treatment and by crosses, this specific peculiarity may be obliterated. To the *gallus giganteus*, as its type, we refer the Herat fowl, of which some specimens were presented to the Zoological Society by Keith E. Abbott, Esq. The following notice respecting them will be found in the *Proceeds. Zool. Soc.* for 1835, p. 92:—

“In addition to the collections (of specimens of zoology from the neighbourhood of Erzeroum) already referred to, Mr. Keith Abbott presented, at the same time, to the Society a cock and two hens of the fowls of Herat in Khorassan—a breed which, he believes, is unknown in Europe. They are young birds of the real Herat race. These, it was stated, are apparently identical with the kulm fowl of Dukhun and the Malay fowl, the *gallus giganteus*, Temm.”—June 23, 1835.

Some writers on poultry regard the *gallus giganteus* of Sumatra and the Malay fowl as distinct. If they found their reasons on domestic varieties, little dependence is to be placed upon them. The perpetual admixture of domestic breeds, and the modifications produced by diet and temperature, are always to be taken into the account. Besides, what other gigantic fowl, occurring as a wild species, can be pointed out from which a huge domestic stock has branched off? We regard the kulm fowl, the St. Jago fowl, the Herat fowl, and the Cochinchinese fowl as so many domestic off-sets, not perhaps

uncrossed with others, of the *gallus giganteus* of Temminck.



JAVANESE JUNGLE-FOWL.

2. The JAVANESE JUNGLE-FOWL. *Javan Cock* of Latham; *Ayam-utan* or *Brooga* of the Malays; (*Gallus Bankiva*, Temm).—This beautiful bird is found wild in Java, and is about equal in size to an ordinary Bantam—the black-breasted red varieties of which, with a dark steel-blue band across the wings, it closely resembles. The space round the eyes and the throat are bare, the comb is much developed and deeply serrated along the upper ridge, the wattles are rather large. Long, clear, brilliant, golden orange hackles cover the neck and rump. The upper part of the back, over which the hackles of the neck are continued, is bluish black. The middle and lesser wing coverts are of a rich deep chestnut, with the webs of the feathers disunited; greater coverts, steel-blue; secondaries also steel-blue, with a border of chestnut. The quills are brownish-black, edged with pale reddish-yellow. Tail black, glossed with changeable green and blue. Breast and under parts black. Contour very graceful, and every action animated and lively.

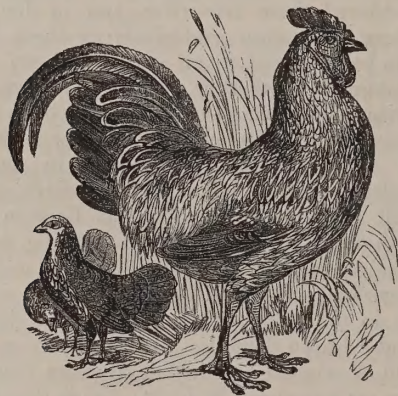
It would appear that an allied but distinct species exists on the continent of India, distinguished chiefly by its larger size. Of this continental species, Sir W. Jardine states that he has seen three or four specimens, all of which came from India proper. From this, perhaps, may be deduced the black-breasted red variety of our spirited game fowls.

With regard to the *Bankiva* jungle-fowl, it cannot be doubted that it is the main source, if not the only one, of our Bantam breeds. The very term *Bantam* is sufficient to establish the fact. Bantam is the name of a town and district in the north-west of Java, belonging at present to the Dutch. The town is now fallen into decay, but was formerly a place of great importance, and

still boasts of a governor, whose residence is at Sirang, or Ceram, a thriving town some miles inland. The Portuguese, who visited Java in 1511, carried on a great trade from Bantam with Hindustan and China, chiefly in pepper. In 1595 the Dutch established themselves at Bantam, and in 1602 the English erected a factory in the same place, which was the first possession of the English in the East Indies. Of the subsequent predominance of the power of the Dutch, who built the town of Batavia, not far distant from Bantam, this is not the place to speak. From this statement, however, it is evident that the beautiful *Bankiva* jungle-fowls, reclaimed by the natives, and sold to the British at Bantam, while their factory was established there, were imported into England under the very natural appellation of Bantam fowls. Their elegance and diminutive size rendered them favourites, and in due time the name, belonging exclusively to these birds, came to be conferred on all small or dwarf fowls indiscriminately, whether of this pure breed or otherwise. The domestic Bantam stock, as every one knows, breeds freely with ordinary fowls, the mixed offspring being intermediate in size between their parents; and that the *Bankiva* jungle-fowl will breed with our domestic Bantam race, and with other races, the offspring being fertile, we ourselves can testify. Such birds are common in the gardens of the Zoological Society, and so closely do the offspring of the *Bankiva* jungle-cock and a brown domestic Bantam hen resemble the wild or original breed, that on more than one occasion we have been in doubt; nor is this to be wondered at—on both sides was the lineage the same.

How far the *Bankiva* jungle-fowl extends through the rest of the Sunda Islands we cannot precisely say; probably it exists both in Sumatra and in Madura, Bally, and others eastward. With respect to the continental relative of the present species, we have little definite information. Two specimens of *gallus Bankiva* were among the birds in the late Chinese Exhibition. If these were obtained in China—that is, as indigenes of the country—the wide range of the *Bankiva* jungle-fowl, or of its continental relative (variety?), is at once proved. We have no reason to doubt that the specimens were Chinese. Nor does Mr. Strickland, in his catalogue of the Chinese birds in that exhibition (*Proceeds. Zool. Soc.* 1842), express any hesitation on the subject. We may observe that, in the same exhibition, were specimens of the Argus pheasant (*Argus giganteus*), hitherto positively known only as a native of Malaya, Sumatra, and some other Indian islands. It is to be observed, however, that the feathers and drawing of this bird, described in *Phil. Trans.*, vol. lv., by G. Edwards, were sent from Canton

to Dr. Fothergill, and are stated to have come from some of the most northern provinces in China. Hardwick's Iris-peacock (*polyplectrum Hardwickii*, Gray, in *Illust. of Ind. Zool.*) was also in the collection. This species was only known as Indian. Mr. Gray's figures were taken from General Hardwick's drawings by native artists. Among the parrots was the rose-ringed parakeet of India (*palaeornis torquatus*). The list is well worth the ornithologist's consideration, as showing the geographical extent of many birds common, some to Europe and Asia, others the distribution of which had always been regarded by naturalists as limited either to continental India or the Indian islands. We know less of Chinese zoology than of Australian, African, or Brazilian.



SONNERAT'S JUNGLE-FOWL.

3. SONNERAT'S JUNGLE-FOWL. *Coq sauvage* of Sonnerat; *Jungle-Cock* of the English sportsmen in India; *Rahn komrah* of the Mahrattas (*Gallus Sonneratii*, Temminck).

4. STANLEY'S JUNGLE-FOWL (*Gallus Stanleyii*, Gray in *Illustrations*).

Under the term "Sonnerat's jungle-fowl," two species of jungle-fowl appear to have been confounded together—at least, by most naturalists—although there can be no doubt of their real distinctness. Colonel Sykes, speaking in reference to the *gallus Sonneratii*, says, "Very abundant in the woods of the western *Ghauts*, where there are either two species, or two very strongly marked varieties. In the valleys, at 2,000 feet above the sea, Sonnerat's species is found slender, standing high on the legs, and with the yellow cartilaginous spots on the feathers even in the female."

"In the belts of wood on the sides of the mountains, at 4,000 feet above the sea, there is a short-legged variety. The male has a great deal of red in his plumage, which Sonnerat's has not; the female is of a reddish-brown colour, and is without

cartilaginous spots at all; in fact, the female of this variety is the *gallus Stanleyii* of Mr. Gray's *Illustrations*." It is apparently to both species that the following observations apply:—"Eggs exactly like those of the domestic fowl in form and colour, but less in size. The wild hen would appear to sit on a much smaller number of eggs than the domestic, as Col. Sykes shot a hen upon her nest in which were only three eggs, and the process of incubation had evidently commenced some days (we must not deduce a rule from an isolated fact). In the craw and stomach of many birds nothing whatever was found excepting the seeds of a stone-like hardness, called Job's tears (*coix barbata*). Irides, deep orange. The crow or call of this species (both species?) is like that of the Bantam cock." To this is added, "The domestic fowl is so abundant in the Dukhun, that in parts of the country not much frequented by Europeans, Colonel Sykes has bought from eight to twelve full-grown fowls for two shillings. Many of the hens, particularly in the villages of the *Ghauts*, are not to be distinguished from the wild bird, excepting only in the want of the cartilaginous spot on the wing coverts."—*Proceed. Zool. Soc.* 1832.

In the female of the *gallus Stanleyii* of Mr. Gray, as Colonel Sykes himself has shown, these cartilaginous spots are wanting, and red (as in so many of our domestic fowls) predominates in the plumage of the males. Yet looking among the jungle-fowls for one of the wild types of our domestic varieties, we would not lay great stress on these points, knowing how soon plumage becomes modified by extrinsic causes. We see something of this in the silk fowl and in the frizzled fowl. Nor will this surprise us when we consider that one well-known domestic race is destitute of the tail and caudal vertebrae, and that another has the skin and periosteum black.

The male of *gallus Sonneratii* may be described as follows. Size intermediate between that of a Bantam and a game cock; but the general contour is peculiarly light and graceful, and vigour and alertness are displayed in every action. The comb is large, with a sub-serrated ridge, that is the ridge is but slightly dentated, in comparison with the comb of the *gallus Bankiva*. The wattles are large and double. The hackles of the neck, the wing coverts on the shoulders, and the tail coverts are dark grayish, with bright golden orange shafts, dilating in the centre and towards the tip into a flat, horny, and very glossy plate. In some of these feathers the shaft takes an elliptical or oar-like shape, in others it puts on the appearance of a long inverted cone, from the centre of the base of which a battledore-like process arises. The substance and appearance of these plates have been, not

inaptly, compared to the scarlet wax-like plates which ornament the tips of the secondary quill feathers of the Bohemian chattering (*bombycilla Bohemica*). We find a similar structure also in the curled metal-like feathers which form the glossy crest of the curl-crested Araçari (*Pteroglossus ulocomus*, Gould). The effect produced by this expansion of the shafts is at once singular and exquisitely beautiful. The feathers of the middle of the back, breast, belly, and thighs, are of a deep rich gray, with paler shafts and edges. The tail is of a deep rich refulgent green, but the feathers which immediately succeed the hackles of the lower part of the back, and lie against the sides of the tail, are rich purple with a pale yellow edge, those next in succession are golden green with gray edges, and all are glossed with brilliant metallic reflections. Bill, legs, and toes yellowish. When seen in a bright sunlight, the plumage of this elegant bird glitters like gold, and presents a most rich appearance. The female is generally described as destitute of those expanded ornaments to the hackles and wing-coverts, which are so conspicuous in the male; and certainly we have not observed them on the specimens which we have seen. That they are present in the females of the *true gallus Sonneratii*, we are assured on the authority of Colonel Sykes, while in the *variety* (species?) with short legs, tenanted the woods on the sides of the mountains at an elevation of 4,000 feet, this peculiarity in the plumage is wanting. Is it not therefore to the females of this *variety*, or as we deem it *species*, that the following description more strictly applies?

Female less than the cock by about a third, without comb or wattles, but a trace of nakedness round the eye. Plumage without the horny structure which distinguishes that of the male. Upper parts uniform brown; neck feathers with dark edges, those of the back and wing-coverts with a pale streak along the shaft; and those of the wings, tail-coverts, and tail, waved and mottled with darker pencillings, throat and front of the neck white; feathers of the rest of the lower parts grayish white, edged with dark brown; legs bluish gray.

Sonnerat's jungle-fowl, the jungle-cock of the British, is noted for its prowess and resolution, insomuch that it is anxiously sought after by the cock-fighters in Hindustan, who rely on it for victory when pitted against larger game cocks. It does not appear however that the Mussulman cock-fighters breed this bird in its purity; they seek after the wild birds, which soon become tame. Johnson, in his *Sketches of the Field Sports, as followed by the Natives of India*, informs us that the Shecarries, a people of low caste in India, gain a livelihood by catching those jungle-fowls, and also other animals.

In taking the jungle-fowl, they adopt the following method:—"Two or three of these men go for this purpose together and proceed in the following manner. A line of thirty or forty yards long is fastened to the ground with wooden pegs, at each extremity, and is then elevated by props to the height of about eighteen inches. To this line nooses of horse-hair are fastened at distances of about two feet from each other, and when the birds attempt to pass under the line, they are caught in the nooses by their necks. Sometimes a similar line is fastened to the ground and left lying there with all the nooses spread, and as the birds pass over them, they are caught by the legs. These lines are never spread where there is much jungle. When the line or lines are ready, the men go off to a considerable distance and beat the bushes in a direction towards them."

In general habits and manners the jungle-fowl resemble their domestic relatives; the cock proudly leads his train of females, and vigilantly watches over their safety. On being suddenly disturbed the troop scatters in all directions, seeking safety under covert of the dense brush-wood. In spots where they are numerous, the challenging of the cocks to each other may be heard on every side around, and yet such is their cunning, and keenness of sight, that the sportsmen, unless he is well acquainted with their habits, is often disappointed in his attempts to get a fair shot.

Many living specimens of the *gallus Sonneratii* have been exhibited in the gardens of the Zoological Society.

Sonnerat and many other naturalists have contended that to this species alone are our breeds of domestic fowls to be traced. We think it most probable, notwithstanding the peculiarity of the plumage, and the circumstance of the throat of the female being covered with feathers, instead of being naked and wattled, that the *gallus Sonneratii* has intermingled with other breeds, or contributed to improve them—and among them we would enumerate the breeds of high-spirited game fowls kept for fighting by the Mussulmans of India, and which have been long celebrated; but we cannot admit that Sonnerat's jungle-fowl is the sole origin of the domestic race. The *gallus Bankiva* and the *gallus giganteus* present stronger claims to our notice, nor can we doubt they contribute the groundwork of some of our most remarkable varieties. There are several other species of wild jungle-fowl, to which we shall here only briefly allude, as they are not likely to have contributed to the establishment of the domestic race. One of these is the Bronzed Cock of Sumatra (*gallus æneus*), a fine species, remarkable for a large comb, smooth along the ridge. The neck is not covered with true hackles. Another is the

Ayam-alas jungle-fowl or fork-tailed cock of Java (*gallus furcatus*). This species has no true hackles on the neck, and the throat is adorned with a single large wattle only, springing from a central line. An intermediate form between the genera *phasianus* and *gallus*, is presented by the fire-backed pheasant of Sumatra (*Euplocamus ignitus*). It is a very splendid bird, and might perhaps be domesticated.

So far, then, have we given a sketch of the remote history of the domestic fowl, as far as obscure hints, notices, or delineations enable us to decipher it; and we have shown to what wild species its origin is, in all probability, to be attributed. The domestic fowl is evidently the oldest, and perhaps the most important of man's acquisitions from among the feathered tribes, its flesh and its eggs being in all countries regarded partly as delicacies always acceptable, and partly as

staple articles of food, at once nutritious and digestible. That a bird which has passed in a domestic state generation after generation for several thousand years, in one country or another, should have branched out into many varieties, will not be surprising—perhaps rather it is surprising that it has not undergone more changes. The varieties, however, are sufficiently numerous, every country having some peculiar to itself, and every breeder founding crosses according to his own fancy—to say nothing of those resulting from chance intermixture. It is to the principal of these varieties only, and, moreover, to such as have obtained footing in our own island, that we can attempt to pay any attention; nor shall we be able to dwell at great length upon them. To omit them altogether, would be an oversight, but we reserve our observations respecting them for another chapter.

CHAPTER II.

ON THE PRINCIPAL BREEDS OF FOWLS IN OUR ISLAND; ON THEIR VALUE IN AN ECONOMIC POINT OF VIEW.

We have already said that the varieties of the domestic fowl are very numerous. In size, in the colour of their skin and periosteum, in the colour and quality of the plumage, in the form of the tail, or its utter absence, in the form of the comb, in the presence or absence of a plume or crest on the head, in the number of the toes, in disposition, and in the qualities of the hens as layers or sitters, differences more or less striking are to be found. Yet amidst all these modifications the characters of the genus are rigidly preserved, save, indeed, in the case of hybrids, which we shall hereafter more particularly notice. At present let us take a survey of the varieties in question.

1. The GAME FOWL.—Among the Greeks and Romans, the pugnacious propensities and indomitable courage of animals, whether quadrupeds or birds, never failed to attract attention. The Romans indeed, whose passion for the combats of the amphitheatre was notorious, collected not only the ferocious tenants of the Lybian desert, for the gratification of their blood-thirsty disposition, but bred up dogs for the arena, and even sent authorized officers into Britain for the purpose of securing those terrible mastiffs for which the island was formerly so celebrated. It cannot be supposed that the combativeness of the game cock (and we may add of the quail) was overlooked. Cock-fighting was as much in vogue in Greece and Italy in ancient days, as it was during the last century in



GAME COCK.

Great Britain, and is at present in India, China, Malacca, and the adjacent islands, as Sumatra, Java, &c. The Greeks possessed several renowned breeds of game fowls, and Media and Persia produced others of first-rate excellence. We have already said that on Cæsar's arrival in England he found the fowl in a domestic condition, but it is very probable that we owe the game breed to the Romans—for when Britain was a Roman colony,

it is not to be supposed that the Romans resident in this island would give up the sports to which they were so passionately addicted, and as they sent British fighting-dogs to Rome, so from Rome might they import their fighting-cocks of Greek or Persian lineage. We do not hear that cock-fighting was practised by the ancient British, but we may be certain that it came into vogue when the British became *Romanized* in tastes, dress, manners, and even in language.

To whatever agency Britain owes the introduction of the game fowl, it cannot be denied that this island has long been the *dilecta sedes* of a race matchless in Europe, and expressly denominated by Buffon the "English Fowl." It is not to be regretted that cock-fighting is prohibited by law, and that the public cock-pits, once to be found in every town, almost in every village, have been abolished; yet that a general deterioration of the game breed has resulted from this step, which humanity and civilization alike demanded, is obvious to every one capable of forming a judgment on the subject. Such would be the case with our breed of racers, were the trials of the turf interdicted. But though the game breed of fowls is at present generally neglected, it is fortunately preserved by some, not for the sake of fighting, but for its beauty, its purity, and ancient lineage. The Earl of Derby possesses a breed which has been in the possession of that noble family for many generations, and this breed is sedulously preserved from base alloy. It is a black-breasted red, with a purple band across the wing, and though superior in size to the Bankiva jungle-fowl it closely resembles that bird in plumage and in elegance of contour.

Our breeds of game fowl are of different colours, but not indefinitely—every breed has its own colour, and every breed has, or rather had its admirers and patrons, who claimed for it pre-eminence over all others, a pre-eminence to be tested on the sod of the arena. "In the choice (says an anonymous writer) of the game or fighting cock, four things are to be principally considered; these are shape, colour, courage, and the sharpness of the heel. As to the shape, such a one should be chosen as is neither too small or too large; the very large ones are always clumsy and unwieldy, and the small ones are slow and tedious in fighting, and are generally too weak to stand a very tight battle; another disadvantage to these extremes is that they are very difficult to be matched: the middle size ought therefore to be preferred, as he is generally the most nimble and active with his strength, and the matching him is easy. The head ought to be small, the eyes large and brisk, and the beak strong and hooked at the setting on; its colour ought also to answer to that of the principal or general colour of the feathers, whether

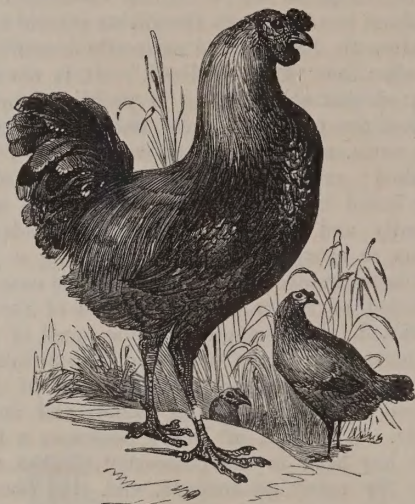
they be yellow, reddish, or gray. The beam of his leg ought to be very strong, and according to his plumage either blue, gray, or yellow; and the spurs ought to be rough, long, and sharp, a little bending and pointing inward. The three colours esteemed in the game-cock are gray, yellow, and red, with a black breast. The perfection of a cock is not, however, tied down to these colours absolutely, for experience has shown that there are cocks of other colours which have proved excellent ones, but these are in general the best. The pied cock sometimes turns out good, but the white and dun are seldom of any value. If the neck of a cock be invested with a circle of scarlet complexion, it is a sign that he is strong and vigorous, and has great courage; but if it be pale and wan, it denotes him to be defective in these material particulars." Here follow directions as to trimming, clipping, and fixing on the steel spurs for combat, which we may pass over. The succeeding observations are worth attention. "The best season for breeding game-cocks, (and good store fowl generally) is from the beginning of February to the middle or latter end of March; the nest for the hen should be made of sweet and clean straw, and should be placed in some warm corner, out of the way of disturbance from any other fowl, for this sort of interruption provokes this quarrelsome bird in such a manner as to endanger the eggs. That she may never have occasion to leave the eggs so long as to cool them, it will be proper to lay all sorts of food that she is likely to approve of before her, and to put clean water every day not only for her to drink but to wash and trim herself in; some ashes, sand, and gravel should also be sifted on the ground near the nest. The chickens are hatched in about three weeks, and the nest is to be carefully watched about this time, for there are always some of the chickens hatched before the others; these should be taken away as soon as out of the shell, and laid before the fire, or in some warm place in wool, and as soon as the rest are hatched these should be given back to the hen. They are not to be suffered to go abroad for the first fortnight, and the room they are kept in must be boarded, all other floors being too cold and too moist. At about a month old the chickens may be turned out into a walk of some fresh grass, that they may feed at liberty and eat worms and other insects; but there must be no puddle of water near the place, for they are apt to get into such, and it occasions them a number of diseases. As soon as the comb and wattles appear on the cocks they must be cut away, and the sore place anointed with fresh butter till it is well. (The cock-fighter only will act in this cruel manner, the fancier will not thus disfigure his birds.) The chickens may be all suffered to run together till they begin to peck one another,

then the cocks are to be separated; each must have his particular walk, and the more freed from disturbance this is the better. The place of feeding them must either be a boarded floor, or a very soft and dry piece of ground. If the place be hard, as a stony pavement, or a plastered floor, the taking up their food will injure and blunt their beaks, so that they will never be able to hold fast afterwards. Any white corn is good for the young game-cock in his walks; and so is a white bread-toast steeped in ale. There should never be allowed more than three hens to one game-cock in his walk; and care is to be taken also as to his roosting-place, that the perch be not too small in the gripe, and be so placed that he may sit upon it without straddling. Game-cocks are brought to the greatest state of their strength and activity in about ten days, but they will scarcely remain twenty-four hours in this condition; nay, some have been known to change for the worse in twelve hours."

Many of the foregoing directions bear rather upon the rearing of the game-cock for the purpose of fighting, than for ordinary utility; but others are of general import.

It is not only for its pugnacious qualities that the game fowl is to be noticed—it yields to no breed, nay, perhaps is superior to most in the whiteness and sapidity of its flesh; the hens are excellent layers, and the eggs, though of moderate size only, are remarkable for the delicacy of their flavour. The game-cock is very attentive to his female train, and ever ready to do battle in their defence, but not unfrequently he becomes savage and dangerous. We have ourselves more than once been fiercely assailed by a game-cock, and be it observed, a blow with his spur is no trifle; several instances have come under our notice in which children have been severely injured, and we have read and heard of cases in which children have been killed. From these causes, and from the fact that the young broods as soon as fairly feathered begin to fight among themselves with desperate determination, blinding each other, stripping the skin from each others' heads and necks, and killing each other on the spot, many persons object to keep this breed, and it must be confessed that it occasions great trouble; it is not always convenient or possible to separate the young broods, and as the young cocks and hens fight indiscriminately, it not unfrequently happens that one-half is destroyed in the *mêlée*, while most of the survivors are so mangled as to render it necessary to put them out of pain, to the mortification of the farmer or breeder of fowls for profit; for not only are the broods lost but the time also. Fanciers who keep a small number only of fowls may manage to rear a young brood by precautions which the farmer cannot put into practice.

Of all the breeds, in our eyes, the game breed is the most beautiful, whether we look to contour or to colouring: the cock carries himself proudly and yet gracefully, his port and bearing proclaim his fiery spirit, his undaunted mettle, which endures even to his last breath, for while prostrate and mortally wounded he will answer the insulting crow of his victorious rival, and make a last effort to revenge himself before the spark of life is extinct. No wonder that the gallant cock should have been chosen as the emblem of courage.



KULM OR MALAY FOWL.

2. The KULM OR MALAY FOWL. As we have already said, this bird is the descendant of the *gallus giganteus* of Sumatra. The pure breed is undoubtedly game; but, except as far as size is concerned, has little to recommend it. The hens, however, are excellent layers, and the eggs are remarkable for their delicacy. In India, or at least in Dukhun (the Deccan), Europeans give this bird the name of the kulm fowl. What good results would ensue by crossing this breed with others we are not able to say—it is a plan, however, recommended by many practical men, both as a means of increasing the size of some long-established races, as the Dorking, and of obviating the degeneracy which sooner or later takes place in all stocks which are bred regularly in and in.

The kulm fowl is kept in a domesticated state, not only in India but in the Malay peninsula, and in Cochin-China; it has been long known in England, although it is only within the last few years that much attention has been directed towards it. Some years since noble specimens from Cochin-China were sent to her Majesty's aviary. These are regarded by some as distinct from the *gallus giganteus*, but we look upon them as a mere domestic variety of the

Malay gigantic fowl, a cross of which probably prevails in most of our larger breeds, as the Spanish and Polish. The eggs of the hen are said to be very large, with a chocolate-coloured shell. How far the rearing and feeding of these huge birds would repay the breeder's or poulterer's outlay, has, we suspect, yet to be proved.

We may here observe that some persons distinguish between the *gallus giganteus* and the Malay fowl or Chittagong fowl. We acknowledge the true *gallus giganteus* to be found wild; but to what other origin are we to attribute the huge Malay fowl, the kulm fowl, the Chittagong fowl, or the Cochín-China fowl? Any trifling differences which strike the eye of the fancier we attribute to the influence of domestication, and accidental or designed crosses.

3. The DUKE OF LEEDS' FOWL, or SHAKEBAG.—A breed of game fowls of enormous size was, about seventy years ago, established by the then Duke of Leeds, and was formerly in high request, that is in the days of cock-fighting, when the strength and prowess of a cock was its highest recommendation. The origin of this breed is not known; but it was most probably formed by a cross with the *gallus giganteus*; the male frequently exceeded ten pounds in weight, and to his great strength was added spirit and determination. The breed is now extinct, but is noticed by Mowbray and by subsequent writers upon Mowbray's authority. It has been suggested that the name of "Shakebag," commonly given to this breed, arose "from the old practice of cock-fighting when the fancy used to challenge *all comers*, having their cock *concealed in a bag*, and the tremendous power and size of the Duke of Leeds' fowl proving so superior to those of all competitors, and usually securing conquest, eventually obtained for it the name *par excellence* of Shake-bag." A breed seldom becomes extinct without leaving some traces at least of its having flourished. Some years since we became possessed of a game-cock (a black-breasted yellow), of immense size, which had been reared in the north of Yorkshire. It had come off victoriously in one or two Welsh mains, and had given the challenge to all comers with unflinching success. We mention this because we have reason to suspect that the fowl in question was the product, if not of the Duke of Leeds' pure strain, of a decided cross with it. It was by far the largest game-cock we had ever seen at the time, or, excepting the *gallus giganteus*, have ever seen since.

4. The BLACK POLAND FOWL.—This variety is by some called the Paduan Fowl; but why these appellations should be given we do not know. The cock and hen are both of a glossy black, and are of large size; in both the head is ornamented with a spreading crest or top-knot of long white feathers,

and the comb is either absent or comparatively small. The hens are excellent layers, and the cock is a resolute bird, though not *game* in the strict acceptance of the term. It is a valuable breed.

5. The WHITE POLAND FOWL.—This stock seems to have passed away, but has been described by Aldrovandus. Both the cock and hen were of a pure glossy white, with a large black top-knot. Bechstein notices this breed, but we question if it ever gained a footing in our island. We know it only by report.



THE SPANGLED POLAND FOWL.

6. The SPANGLED POLISH.—Fanciers discriminate between this breed and the spangled Hamburg, although by many they are confounded together. Both are crested, but in the Hamburg there are distinctive peculiarities to be hereafter noticed. The spangled Polish is a very beautiful and valuable bird, and by no means of everyday occurrence. The plumage generally is of a clear orange, with shades of brown and green, every feather being tipped with *white*, so as to produce a spangled appearance. The hackles are green and orange-brown; the thighs black, more or less spangled with golden yellow. The hen is of a golden yellow, shaded with brown, and spangled with *white*. This breed is valuable, not only for its beauty, but for the excellence of its flesh. The hens are good layers, and make attentive nurses.

6. The SPANGLED HAMBURG.—In the spangled Poland of pure strain there is no comb; in the spangled Hamburg there is a small comb, rising up into two, sometimes more, conical eminences or horns, and behind this is a large full pendent top-knot. The wattles are small, and under the lower mandible on the throat is a full

dark-coloured tuft of feathers. The general colour is golden or orange-yellow, each feather having a glossy dark brown or black tip (not white), particularly remarkable on the hackles of the cock, and the wing-coverts, and also on the darker feathers of the breast. The female is yellow or orange-brown, the feathers in like manner being margined with black. Birds thus coloured are called *golden-spangled*, but there is also a *silver-spangled* variety, differing in the ground colour of the plumage being of a silvery white, with perhaps a tinge of straw-yellow, every feather being margined with a semi-lunar mark of glossy black. Both varieties are extremely beautiful, and the hens lay freely. First-rate birds command a high price, and the same observation applies to the spangled Poland.

7. The SPANGLED or DUTCH EVERLASTING LAYER.—In this breed there is no top-knot, but a large and well-formed rose crown, or double comb; the wattles in the cock are greatly developed, and have a decided reduplication or second fold. The cock is of a general reddish brown, the hackles being of a deep golden yellow, each feather being spangled with black. The hen is yellowish brown, similarly spangled. In this breed, as in the Hamburg, a silver-spangled variety occurs, the general ground colour being white.

This breed, of no common beauty and value, receives its name from the circumstance that the hens, if properly fed, and kept in a warm situation protected against the cold, will continue to lay throughout the whole of the year, or nearly so, and thus afford an unfailing supply of eggs. In general fowls after laying for a certain length of time become *broody*—they cease to lay, and evince an uncontrollable desire, an instinctive propensity to devote themselves to the task of incubation. They are impelled by the law of nature, which urges them to this essential mode of continuing their race; but in the present breed, in which the season of laying is preternaturally lengthened out, or is almost continuous from spring to spring, this natural desire is greatly weakened, or indeed altogether subdued. The hen betrays no anxiety to incubate, but continues to lay eggs as if for no other purpose than to repay her keeper. Hence, to obtain a brood of this stock (and it should be kept in its purity) the eggs must be put under a good sitter, of any common breed, a few of which may be kept for the express purpose, and thus the fancier may replenish his stock. It is not often that pure everlasting fowls are to be seen, and this renders it the more desirable that those who possess breeds should sedulously preserve them from admixture; a cross will spoil the hens as “everlasting layers,” without rendering them enduring patient sitters.

8. The SPANISH FOWL.—Like the black

Poland this breed is clad in glossy sable plumage, but is not crested with a top-knot; on the contrary, the comb is remarkably large, single, and often



THE SPANISH FOWL.

pendent on one side; the wattles are extremely developed, and the skin below the ear on each cheek is *white*, contrasting strongly with the scarlet of the comb and wattles, and the glossy black of the plumage. The cock is a noble and stately bird, remarkable for size and height; it is in fact superior in stature to all our domestic races, if we except the Kulm fowl, and at the same time it possesses excellent symmetry. The hen is also of large size and good figure. Brought originally, as it is believed, from Spain, this breed is nevertheless very hardy and well adapted to our climate, and is reared as easily as any of inferior importance. To those who breed fowls for the sake of the flesh and eggs, this fine variety cannot be too strongly recommended. The flesh is delicately white, tender, and juicy, and the hens are free layers. Some persons complain that the hens are far better layers than sitters. Better layers are none, but we cannot say that we subscribe to this complaint; indeed, a breeder of these fowls, for his own use, in the neighbourhood of the writer, affirms that the hens make excellent sitters and nurses, and he has had many years' experience respecting them. The eggs are of very large size, and of first-rate flavour.

Inferior cross-breeds of this Spanish variety are very often to be seen; but such are not worth keeping. Let the pure strain only be adopted; it may be preserved from degenerating by the occasional introduction of males of the same race, and up to the mark in every point, which have descended by a collateral branch from the same root, and which have therefore only a remote con-

nection with the stock to which they are admitted. It is thus that breeders may often benefit each other by mutual exchanges.

9. The DORKING FOWL.—Surrey is noted for its fowls, especially for that breed which passes under the name of Dorking, and which is cultivated in the district surrounding that celebrated town. The Dorking fowl is a short-legged, plump, round-bodied fowl, remarkable for having five toes,—that is, a supernumerary hind toe. We have indeed seen some with one or two more supplemental toes, in a rudimentary condition, and which appeared anything but ornamental. The pure Dorking fowl is of good size, and of a white colour, but such are now seldom seen. During a recent visit of some weeks to Dorking, though we visited the market regularly, and explored the country round, on one or two occasions only did we meet with pure white birds. In all, however, more or less white prevailed; but the cloudings and markings of the plumage were unlimited. Many were, as we observed, marked with bands or bars of ashy gray, running into each other at their paler margins. Some had the hackles of the neck white with a tinge of yellow, and the body of a darker or brownish red colour, intermixed irregularly with white; yet in all were the five claws present. Neither in form nor colouring is the Dorking breed attractive; it is too rounded on the body, and too low on the limbs to be graceful; but its flesh is in high repute, and vast numbers of these fowls are sent to the London market. The breed is of great antiquity, and we fancy that the “couple of short-legged hens” which Justice Shallow of “Glostershire” ordered for the entertainment of Sir John Falstaff, must have at least been closely related to it. Some suppose it to have been introduced by the Romans; of this there is no proof; yet it is certain that a five-toed breed existed anciently in Greece, and is noticed by Aristotle, and that a similar breed existed in Italy in the days of Pliny and Columella. Aldrovandus (16th century) refers to a five-toed variety which was not uncommon in Italy when he wrote, and we believe that many-toed fowls are to be found in Germany. Is there not, we would ask, a tendency in all short-legged fowls to the growth of supernumerary but imperfect toes? The body is large, the arterial system vigorous, and more blood is transmitted along the arteries of the legs than is simply sufficient for their due development. This results in the partial development of supernumerary or additional parts, where the division into toes at the extremity of the *tarsus* takes place, and might thus occur in breeds otherwise not immediately related to each other. Hence might arise the Dorking variety, irrespective of any Roman lineage. We do not insist upon this view of the subject; yet, that a breed owing its

introduction to the Romans should until lately have been so isolated in its locality is somewhat surprising. Recently it has been introduced into other parts of England, and also into Ireland, and in the latter instance without any deterioration. It is chiefly for its flesh that the Dorking fowl is valued, yet the hen is an excellent layer and sitter, as in fact all short-legged fowls are; in incubation, indeed, the advantage of short legs is evident; the eggs are in less danger, and less liable to disturbance.

The Dorking breed, more or less crossed, is to be seen in Sussex. In the Sussex fowls the body is more elongated than in the pure Dorking; many, however, are five-toed. We have lately seen in several farm-yards in Kent flocks of five-toed fowls, differing in no respect as far as we could judge from the Dorking, either as respects form or style of colouring, and we doubt not that they were of that esteemed variety, which has now spread to more distant counties. It is asserted that if removed to an inferior soil or climate, the Dorking fowl degenerates in spite of all care in the breeding; the flesh loses its characteristic superiority, and the hens their character as layers. How far this may be true we have had no opportunity of proving; no fowls prosper in cold, damp, bleak, and exposed situations; moors and mosses, bogs and marsh lands are not congenial to them, and hence, though the Dorking breed may flourish in Surrey, Berkshire, Sussex, and Kent, it may not thrive in the northern and border counties.

10. The PERSIAN or RUMPLESS FOWL.—This breed, called also the Rumpkin, or tail-less fowl, is supposed by Latham and others to have been brought originally from Persia. It is of moderate size and variable in colour, but is characterized not only by the absence of tail feathers, but of the tail itself, the caudal vertebrae being either wanting, or deficient in number, and rudimentary. There is consequently no tail-gland, which according to some authorities secretes a fluid for dressing the plumage and giving the feathers their gloss; of this we are sure, that the feathers of the Rumpless fowl are as bright and glossy as those of any other breed. Some years since we kept a large flock of these fowls so singular in their appearance, but did not find them profitable. The hens were tolerably good layers, and this is all that can be said; for the flesh was certainly not first rate. It is a breed by no means to be commended; fowls of the most profitable and valuable description require no more outlay for food than others, and give satisfaction.

11. The FRIZZLED or FRIESLAND FOWL.—This variety, the *gallus crispus* of Temminck, is originally from Eastern Asia, and is often seen in Java, Sumatra, and in India. It is not a distinct species, but a mere variety, and one

moreover unworthy of any attention; in England indeed it is rarely to be met with; it is small, very delicate, and ill fitted for a humid changeable climate. It takes the name of *frizzled* (for Friesland is a name given under an erroneous supposition) from the circumstance that all the feathers, those of the wings and tail excepted, are curled up the wrong way, and give the bird an unsightly appearance. A shower drenches it to the skin, and hence the young are reared with difficulty. In one point of view it is interesting, as showing the influence of domestication in modifying the less essential portions of the frame—an influence affecting in fowls the comb, the wattles, the tail, the legs, and, as in the present case, the very character of the feathers.

12. The **SILKY FOWL**.—M. Temminck considered this variety also to be specifically distinct, and has described it as the *gallus lanatus*. It is of small size, and covered with white dishevelled silky feathers, each like a plume of glossy silken filaments. The comb and wattles are of a dark purple with a tinge of lake, the skin is blue or purple, and the periosteum is dusky black. The flesh however is white, and said to be tender. It comes from Japan and China, but is too delicate for our climate, and is therefore seldom to be seen in Britain. The female is said to lay numerous eggs, but of a small size. This variety readily interbreeds with the ordinary fowl, but the cross is of no value. Here we have another remarkable instance of the extent to which the results of domestication may be carried.

13. The **BLACK FOWL**.—This variety is the *gallus morio* of M. Temminck, and has been supposed, but on erroneous grounds, to be a distinct species. It is of moderate size, with variable plumage, and generally a rose comb. The comb, wattles, and skin, are of a dark purple blue, and the periosteum is black. In these points, though not in feathers, it agrees with the silky fowl, and as we can testify from experience, its flesh is white, tender, and juicy. A gentleman of our acquaintance had several of these birds, which were sent to him from India; he bred from them, and on two or three occasions sent us "specimens," not to preserve, but to eat. A similar breed is said to exist in some parts of Africa, but no individuals from that country have ever come under our notice.

14. The **BANTAM**.—Of the source whence the Bantam breed has been derived, we have already spoken. Since its introduction into Europe, it has ramified into many varieties, none destitute of elegance, and some remarkable for beauty. All are, or ought to be, of small size, but lively and vigorous, exhibiting in their movements both grace and stateliness.

One variety is remarkable for the tarsi or

beams of the legs being plumed to the toes with stiff long feathers which brush the ground. This variety is less often seen than formerly, perhaps owing to the little care taken in preserving it from admixture. Another variety closely resembles the Bankiva jungle-fowl, it is often red, with a black breast and a single den-tated comb. The tarsi are smooth and of a dusky blue. In spirit and courage this sort of Bantam, if pure, yields not to any; it is in fact a game fowl in miniature, and is as beautiful and graceful as it is spirited.

We have seen a pure white kind of Bantam, agreeing except in colour with the foregoing, and we believe that Bantams of this breed are kept in the Royal Aviary, Windsor.

But the most celebrated and beautiful breed of Bantams is that which Sir John Sebright brought



SIR JOHN SEBRIGHT'S SILVER BANTAM.

to perfection after years of careful trials. It is very small, with unfeathered legs, and a rose comb and short hackles. The plumage is gold or silver spangled, every feather being of a golden orange, or of a silver white, with a glossy jet black margin; the cocks have the tail folded like that of a hen, without the usual recurved drooping sickle feathers, or rather these feathers are abbreviated, straight or nearly so, and broader than usual. Hence the term *hen-cocks* often applied to them. But although the sickle feathers are thus modified, no bird possesses higher courage, or a more gallant carriage. The attitude of the cock is indeed singularly proud, and we have often seen one of them bear himself so haughtily, that his head, thrown back as if in disdain, has nearly touched the two upper feathers (sickles we cannot call them) of his tail. Half-bred birds of this kind are not uncommon, but birds of the pure breed are not to be obtained without trouble and expense; indeed, some years ago, it was almost impossible to procure either a fowl or an egg. The finest

we have ever seen were in Sir John Sebright's poultry-yard, adjacent to Turnham Green Common, in the bye-road leading to Acton. At the same place were kept several breeds of fancy pigeons, of extraordinary qualities and beauty; and these and the fowls could not but arrest the eye even of the most indifferent. We have seen a description of Sir John Sebright's Bantams in which the tail feathers and breasts are set down as *black*, no allusion being made to the peculiarity of the tail feathers. We suspect the description to have been taken from Bantams which had no claim to the title given them. The tail feathers are not *black*, but partake of the general tint of the plumage, and the breast is golden or silver (as the case may be), beautifully spangled.

These are the only Bantam breeds peculiar to our country worth attention. What others may exist on the continent we cannot say; we do not remember to have seen any in France, but this circumstance proves nothing. Buffon describes a short-legged Bantam breed which existed in his days in Brittany; a similar breed is noticed by Pliny, and also by Aldrovandus. The legs were so short, that progression was effected rather by a series of hops, than in the ordinary manner.

As far as regards *practical utility* little can be said in favour of the Bantams, however attractive from their beauty; their eggs, it is true, are delicately flavoured, but then they are too small to be saleable, or worth the farmer's or poulterer's notice. The fact is, that these Lilliputian breeds are in the strict catalogue of *fancy fowls*, among which we may place the almond-tumbler pigeon, the fan-tail, the jacobine, and others. They are kept, to use the words of Cæsar, "*animi voluptatisque causâ*."

Besides the peculiar breeds of fowls to which we have already alluded, there are several others with which we have no personal acquaintance, and which are rather local than generally distributed. Of these one is called the Siberian or Russian fowl, though we know not on what grounds. The fowl is rare in the northern parts of Siberia, and does not breed in the high boreal regions; in Iceland it is kept only by a few persons, and that as a matter of curiosity.

15. The RUSSIAN FOWL.—This variety "is distinguished by tufts of dark-coloured feathers springing from each jaw, and others longer and fuller, springing from the lower mandible in the form of a beard, as in the bustard. The colour varies; some are white, some blue or black, and others are coloured like the game fowl. The flesh of this variety is white and good. They are likewise good layers, are hardy, and easily fed. Dickson says that they are great favourites in Scotland. At the Royal Dublin Society's Show, April, 1846, specimens of this fowl were exhibited by Mr. Nolan." It appears that this breed is

sometimes gold or silver spangled, resembling the spangled Hamburg in markings. This colouring adds to their beauty, and enhances their value.

16. The BARN-DOOR FOWL.—Under this term may be included all fowls which are kept without any particular attention to breeding, or which are the result of various and indiscriminate crossings, and have no fixed standard of colouring or any distinctive characteristics. Of such in general the flocks of fowls kept by the farmer or the cottager are composed. If they are hardy, have good flesh, and lay abundantly, the great end to be obtained by keeping them is answered. It is no doubt desirable that a little more systematic care should be paid by the farmer than is generally done, that less should be left to chance, and some discrimination exercised in the choice of stock. We do not claim for the fowl a weight in the scale of importance equal to that of the ox, sheep, or hog, at the same time we contend that the importance of poultry is greater than at first sight might appear, consequently, that all attempts to establish good breeds at once hardy, white fleshed, quick fatteners, and abundant layers, are meritorious, nor indeed are the efforts of the professed fowl-fancier to be regarded as useless. Were it not for his labours and care, the continuance and improvement of no breed, it is to be feared, would be effected. There would be no stocks to which to apply, by way of correcting the degeneracy of any race. The ordinary standard of size would become diminished, and this perhaps accompanied by a partial loss of fecundity. Besides, the fowl-fancier, whether he knows it or not, is in the establishment and perfection of his breeds conducting physiological experiments of no ordinary interest.

We have just observed that the importance of poultry is greater than at first sight might appear, but reflection will serve to convince any person that this is the case. "Poultry," says Mr. McCulloch, "are objects of very considerable importance, directly on account of their eggs, (flesh), and feathers. Turkeys, geese, and ducks, are reared in all parts of the country in considerable quantities, but common fowls are by far the most numerous and valuable. The Dorking cock and hen, so called from the town of Surrey of that name, are the largest and most valuable of the common fowls, and are readily distinguished from other varieties by having five toes to each foot. North Chappel and Kensford in Sussex are famous for their poultry; perhaps, however, Oak-ingham, in Berks, is in this respect the most celebrated. The fowls are sold, fattened, to the London dealers, and as much as £150 has been paid for them in a single market-day (*Mavor's Berks*, p. 462). The trade in eggs between the country and the towns is of very considerable im-

portance. Exclusive of immense importations of foreign eggs, London draws large supplies from the adjoining counties. The value of the eggs exported from Berwick only to the London market, previously to the peace of 1815, has been said to amount to £30,000 a-year, though this is probably an exaggeration (*Penny Cyclopædia*, Art. BERWICK). But this export has almost entirely ceased, French eggs being, notwithstanding the duty of 1*d.* per dozen, cheaper than those usually brought from the more distant counties. In 1796 it was calculated that the peasantry of Midlothian drew about £8,000 a-year for poultry and eggs, though generally speaking Scotch poultry of all descriptions are very inferior to English.* Wales transfers poultry and eggs in vast numbers to the adjacent English counties, but we are unable to obtain any statistical details.

Under the article EGG TRADE, in the *Supplement* to the *Penny Cyclopædia*, we have the following estimate given, which will, perhaps, excite some little surprise:—

“In 1835, the value of eggs exported from Ireland to Great Britain was £68,687, and at the present time may exceed £100,000.* At 4*d.* per dozen, the number of eggs which this sum would purchase would be 72,000,000. From France and Belgium we imported 96,000,000 eggs in 1840, on which the duty of 1*d.* per dozen produced £34,000. Nine-tenths of the foreign eggs are from France. The departments nearest to England, from the Pas de Calais to La Manche, are visited by the dealers, and their purchases often produce a scarcity in the country markets. At most of the ports of these departments, from Calais to Cherbourg, some vessels are employed in the egg trade. The weight of 80,000,000 eggs is not far short of 2,500 tons. In the last three years the importations of foreign eggs were as follow:—

In 1842	.	.	.	89,548,747
„ 1843	.	.	.	70,415,931
„ 1844	.	.	.	67,487,920

The consumption of eggs at Paris is estimated at 100,000,000 of eggs a-year.”

Everywhere, we may add, in France is poultry abundant and cheap, and eggs form an important article of diet. M. Legrand, a member of the French Statistical Society, says—“The consumption of eggs in Paris is calculated at 115½ eggs per head, or 101,052,400. The consumption in other parts of France may be reckoned at double this rate, as in many parts of the country dishes composed of eggs and milk are the principal items in all the meals. The consumption of eggs for the whole kingdom, including the capital, is estimated at

7,231,160,000; add to this number those exported, and those necessary for reproduction, and it will result that 7,380,925,000 eggs were laid in France during the year 1835.”

The exportations from France in 1835 were as follow:—

To England	.	.	.	76,190,120
„ Belgium	.	.	.	60,800
„ United States	.	.	.	49,696
„ Switzerland	.	.	.	49,260
„ Spain	.	.	.	34,800
„ Other parts of the world	.	.	.	306,304

The total amount of the exportations for that year was 3,829,284 francs. France is essentially a fowl-keeping country. The farms, owing to the system of subdivision of landed property among the sons of a proprietor at his decease, are small, and poultry constitutes a profitable stock upon them, especially as they will feed but few cattle. Around every farm-house troops of poultry are to be seen. They swarm everywhere, and the markets of every town are abundantly supplied. We never saw much of *breed* in any of them, but in some parts considerable attention is paid to their rearing. There is a peculiar variety in the peninsula of Caux in great esteem. The fowls of this district are fattened, in the environs of Barbézieux, La Flèche, and especially Mons, for the tables of the luxurious. On the whole, we should say that the value of the fowl was better appreciated in France than in England, although, at the same time, we think that we possess breeds superior to any of which France can boast.

The following interesting statistical remarks are taken from a paper in the *Penny Magazine* for March, 1837:—

After premising that, in the year 1837, the number of eggs imported from France into England amounted to 69,000,000, the writer says—“These eggs cannot be obtained from much fewer than 575,000 fowls, each producing 120 eggs on an average, all beyond this number being required for domestic consumption. Assuming the grounds of this calculation to be correct, the 55,000,000 eggs, which a writer in a newspaper printed at Arras states to be the amount supplied to England from the Pas de Calais, are the production of 458,333 fowls, each of which furnishes ten dozen eggs, imported at a duty of 10*d.*, being a tax to that amount on each fowl. Allowing twelve fowls to each family engaged in supplying the demand for eggs, the number of families thus interested will be 39,861, representing a population of 198,000. In the Pas de Calais there can scarcely be a larger population than two families out of every five who are connected with the egg trade; and if this were ascertained to be the real proportion, the population not directly engaged would be 457,000, which, with the 198,000 above mentioned, would comprise a total population of

* Mr. McCulloch says, the price paid by England to Ireland for eggs and poultry may be estimated at from £200,000 to £300,000 a-year.

655,000, which is the population of the department. The superficies of the department being 2,624 square miles, it is equal in size to the counties of Bedford, Berks, Buckingham, and Hertford put together. Over this extent of country must those who are engaged in the egg trade keep a vigilant eye, penetrating into every hamlet, and visiting the lone houses which are scattered in this part of France, perhaps more numerous than in other departments. Some arrangements of a peculiar nature are obviously required to facilitate the transactions of the wholesale dealer, who probably resides at the port whence the eggs are shipped. The services of a subordinate class of dealers are, doubtless, called into activity; and as it would be a waste of time for each of these to visit every week, or at a stated period, every one of the 39,861 houses whence they draw the quantity required, other arrangements of a still more detailed character are necessary, in order to bring the article within grasp. We are not acquainted with the precise system adopted by the dealers in the Pas de Calais—whether, for instance, they can depend upon the supply brought into the markets on stated days; but if this be not the case, then, the circumstances being analogous to those noticed by Mr. Weld, in his *Statistical Survey of the County Roscommon*, something like the practice which he describes may have grown up in France, as it has done in Ireland. Mr. Weld's account, which supplies some interesting facts relative to the trade of eggs in Ireland, is as follows:—"The trade of eggs, the value of which for export, according to Mr. Williams, in 1832 amounted to £500 a-day, paid by England to Ireland, is carried on with considerable vivacity at Lanesborough, and also at Tarmonbarry. The eggs are collected from the cottages for several miles round, by runners, commonly boys from nine years old and upwards, each of whom has a regular beat, which he goes over daily, bearing back the produce of his toil carefully stowed in a small hand-basket. I have frequently met with these boys on their rounds, and the caution necessary for bringing in their brittle ware with safety seemed to have communicated an air of business and steadiness to their manner unusual to the ordinary volatile habits of children in Ireland. I recollect one little bare-footed fellow explaining that he travelled daily about twelve Irish miles (above fifteen English miles). His allowance, or rather his gain, was one shilling upon every six score of eggs brought in, the risk of purchase and carriage resting entirely on himself. The prices vary from time to time at different periods of the year, but they are never changed without previous notice to the runners. In the height of the season, the prices at Lanesborough were from

2s. 6d. to 4s. per 120, but towards the winter they rise to 5s. The eggs are packed in layers with straw, in such crates as are commonly used for the conveyance of earthenware. Each crate will hold about eighty-four hundred of six score—that is, 10,080—the first cost being from £10 10s. to £16 16s. per crate. These are sent forward on speculation to Dublin, or occasionally at once to the English market, and a profit of £4 or £5 per crate is considered a fair remuneration. Sometimes it is more and sometimes it is less, and there is risk in the trade. From Lanesborough the crates are sent over land to Killashee, the nearest place on the line of the Royal Canal, and forwarded by the fly trading boats to Dublin. At Tarmonbarry I saw several cars come in laden with crates of eggs, from the neighbouring districts on each side of the river. The dealers at Lanesborough with whom I conversed, whilst in the act of packing their crates, seemed quite surprised at my question, whether they ever used any artificial means of preserving the eggs; and could scarcely credit the account I gave them of the possibility of preserving their freshness for a considerable time, by simply anointing them with any unctuous substance, such as butter or lard; but in this process the whole of the egg must be carefully covered, and it should be done soon after the egg is laid."

In a table of the exports of Irish produce, given in the Article IRELAND (*Penny Cyclopædia*), the following statement is given:—

Eggs & Feathers.	Quantity in 1835.	Estimated Value for 1835.
Number . . .	52,244,800	£87,352 0 0
Crates . . .	2,274	37,160 0 0
Boxes . . .	10,695	31,027 0 0
Feathers, } Cwts. }	6,432	32,636 0 0
		£188,675 0 0

No notice is taken in the statement, from which the above is merely an extract, of the number or value of poultry exported from Ireland; but we know that vast quantities of fowls, geese, ducks, &c., are sent over to England—or at least were so—till recent calamities, beyond human control, rendered that beautiful island a scene of misery.

The census returns for 1841 present us with an *ad valorem* estimate of the poultry (of all sorts) kept in Ireland, the pecuniary value of each fowl being reckoned at the small sum of 6d. This census, however, is only an approximation to the truth; for, as we are credibly informed, the country people were not unnaturally suspicious of the intentions of the parties employed to ascertain the point in question, and apprehending that the inquiry was only the prelude to some

new tax, they gave such statements as seemed most advantageous to their interests; hence their returns were below the mark numerically, and, consequently, also in a pecuniary point of view; still the document is interesting.

CENSUS RETURNS, 1841.—VALUE OF POULTRY.

LEINSTER.		MUNSTER.	
Carlow	£2,550	Clare	£1,031
Dublin	2,859	Cork	23,547
Kildare	3,986	Kerry	7,864
Kilkenny	6,962	Limerick	10,687
King's County	5,077	Tipperary	4,794
Longford	3,943	Waterford	14,907
Louth	3,385		
Meath	7,566		£62,830
Queen's County	5,138		
Westmeath	5,343		
Wexford	6,389		
Wicklow	3,045		
	£56,243		
CONNAUGHT.		ULSTER.	
Galway	£10,753	Antrim	£3,998
Leitrim	4,083	Armagh	3,829
Mayo	8,457	Cavan	6,609
Roscommon	7,814	Donegal	5,744
Sligo	4,109	Down	6,992
	£35,216	Fermanagh	4,113
		Londonderry	4,027
		Monaghan	5,314
		Tyrone	7,257
			£47,883

The total sum, according to this estimate, is £202,172. Hence the number of poultry returned amounted to 8,088,680, reckoning them at 6d. per head; but, as we have said, this number is far below the mark.

Mr. Richardson, in a little work on Domestic Fowls (Dublin, 1847), says—"I have had a statement furnished me, by Mr. P. Howell, secretary to the City of Dublin Steam-Packet Company, to the following effect:—The number of boxes of eggs shipped by that Company's vessels for London, during the year 1844-5, was 8,874; about the same number was shipped by the British and Irish Company, making a total of 17,148 boxes. Each box contains 13,000 eggs, but occasionally large boxes are used, containing more than four times that number. This gives the result of 23,072,400 eggs as annually shipped for London. To Liverpool were shipped 5,135 boxes, containing 25,566,500 eggs, making a total of the shipments from Dublin alone, during the year 1844-5, to the two ports of London and Liverpool, of 48,639,900, the value of which, at the average rate of 5s. 6d. per every 124 eggs (the return made), gives a sum amounting to about £122,500 as the annual value of the eggs shipped from Dublin alone; and, since this return, the export of eggs has enormously increased. Assuming the export of Dublin to be equal to one-fourth of the exports of all Ireland (a calculation reaching much above the mark), we have very close on £500,000, or half a million, as the value of this branch of commerce to Ireland, showing also an increase of four-fold since 1835." The writer adds, in a note—"By

the same returns, I have ascertained that the export of eggs is now nearly doubled, bordering on a million sterling." "No return has been made of the number or value of the poultry that have, living or dead, been exported from Ireland; but it has been ascertained, beyond all possibility of doubt, that this branch of commerce has been, of late years, greatly on the increase."

We know of no means by which we can arrive even at a rough estimate of the number and value of poultry kept in Great Britain, of the annual value of the poultry consumed as food, or of the number and total value of the eggs produced. Were the figures placed before us (could the amount in pounds and shillings be ascertained) it would perhaps excite astonishment; yet we have but to reflect upon the daily supply demanded by London alone, and to observe how abundantly the demand is met, to feel convinced that many thousands of pounds weekly change hands, in reference to home-bred poultry, and new-laid or farm-house eggs. But to the consumption of London must be added that of the rest of England, of Wales, and Scotland, and this being done, will it not be conceded that the importance of poultry, in a national point of view, is apt to be overlooked. We look at the value of a single egg and of a single fowl, forgetting that these are only fractions of an enormous totality, just as a farthing is the fraction of millions of pounds sterling; nor is the comparison inappropriate—for the value of the poultry of Great Britain, at any given time, must amount to more than a million sterling. This property is greatly subdivided, it is in the hands of numerous proprietors, and to each is his portion of peculiar interest. We have sufficiently proved the general importance of poultry, let us next attempt to show their importance, if well managed, to the farmer or cottager who has due convenience for keeping them. Profit is the object in view; now this profit will arise from two sources—the sale of the eggs, and the sale of the young stock, for the purpose of being fattened for the market. The cottager will look principally to the sale of his eggs, the farmer to both sources of gain, at least if he have the means of keeping a large stock. The demand for young barn-door fowls is unceasing, their sale, therefore, at the most advantageous time, may be safely calculated upon; spring chickens sell for a high price in large towns, these consist of March broods, which ought to be well fed, and kept well sheltered from cold winds and rain. The later broods may be sold to the feeder, who fattens them by cooping, by diet, and often by cramming, for the tables of the luxurious. Higgles go round the country for the purpose of making purchases, and if the fowls have been properly fed, not only are they sufficiently fat, but

have a far finer flavour than have fowls fed in confinement on unnatural diet, and overladen internally with layers of rank disgusting fat. Besides, the markets in all large towns afford facilities of disposal which may be turned to advantage. It is astonishing to see the number of fowls, in wooden coops or cages, brought every market-day (Thursday) into Dorking, for sale. Very few are taken back in the evening to the quarters they occupied the day previously. In other towns, as Reigate, Wokingham or Oakingham, the market is similarly supplied, and the same may be said of other places. In the counties bordering on the metropolis, particularly Surrey, Sussex, Essex, Cambridge, Norfolk, and Berkshire, the rearing and fattening of poultry for the London market is in fact thought worthy of attention by considerable farmers; and now that railroads intersect the country in every direction, the produce of more distant districts may be readily transported to the same all-absorbing city, or to other towns where the demand is active. It is indeed a matter of doubt whether England produces home-bred fowls adequate to the unceasing demand in the markets for them. Certain it is that fowls in London are seldom cheap, and often sell at very high prices. Leadenhall market, in London, is the great dépôt for poultry, dead and alive, from various parts of the country—they are consigned to salesmen, who transact business with the poulterers, and are as it were agents between the seller and the buyer. Latterly great numbers of fowls have been sent to the metropolis from Devonshire, and in numerous instances Devonshire houses, as they are called, have been established for the sale of fowls and other produce of that county. These are received direct, that is, without the intervention of salesmen, and return a large profit.

The aim of every one who keeps fowls, should be the possession of a first-rate stock, whatever the breed may be. Every breed has its standard of excellence, and it is desirable to have that standard raised as high as the most approved system will carry it; hence it is that poultry-shows have been instituted in various counties and towns, and are on the increase. Their object is the same as that of the cattle-shows, with this exception, that specimens of breed, exhibiting the distinctive characters of their race in all their perfection, and combining with these beauty and admirable contour, come in for their share of the prizes. In some cases the show consists of fancy-fowls only; in others, of fowls to be tested by their fattening capabilities—age, diet, and treatment being taken into consideration. We may here advert to the poultry-shows under the direction of the Zoological Society of London, those of the Highland Society of Scotland, those of the

Royal Agricultural Improvement Society of Ireland, those of the Royal Dublin Society, and others in various parts of the country, under the patronage of gentlemen distinguished for their love of the *res rustica*. Among the shows more expressly devoted to the display of fattened poultry, we may instance that instituted some years ago at Chapel Bampton in Northamptonshire, by the Earl of Spencer. At a show held in 1829, the prize fowls claimed general admiration for their qualities. The best turkey weighed 20 lbs. 4 ozs., capon 7 lbs. 14½ ozs., pullet 6 lbs. 3½ ozs., goose 18 lbs. 2½ ozs., couple of ducks 15 lbs. 10 ozs. Fattened poultry are brought to the show of the Agricultural Association of Cirencester (Gloucestershire), and we have heard of some specimens remarkable for their weight, having at different times been exhibited.

As a general rule, the cottager will find the greatest profit accrue to him from the sale of eggs. It is not often, says Cobbett (*Cottage Economy*), that fowls can be kept conveniently about a cottage; "but when they can, three, four, or half a dozen hens to lay in winter, when the wife is at home the greater part of the time, are worth attention. They would require but little room, might be bought in November and sold in April, and six of them, with proper care, might be made to clear every week the price of a gallon of flour."

We doubt the success of this plan. It is not very easy to determine whether the fowls to be purchased in November will lay during the winter months; and, if they do not, the cottager suffers a loss. On the contrary, if they are positively noted as good winter layers, they will cost a considerable sum of money. Moreover, their sale in spring is a matter of uncertainty, and the cottager may lose instead of gain by the transaction. We should advise a cottager (where he has proper conveniences) to keep half a dozen good laying fowls throughout the year, to save their eggs for sale, and to rear also for sale three or four early broods of chickens. If the hens will lay through the winter, so much the better.

Martin Doyle, the cottage economist of Ireland, in his *Hints to Small Holders*, observes, that "a few cocks and hens, if they be prevented from scratching in the garden, are a useful and appropriate stock about a cottage, the warmth of which causes them to lay eggs in winter—no trifling advantage to the children when milk is scarce. The French, who are extremely fond of eggs, and contrive to have them in great abundance, feed the fowls so well on curds and buckwheat, and keep them so warm, that they have plenty of eggs even in winter. Now, in our country (Ireland), especially in a gentleman's fowl-yard, there is not an egg to be had in cold

weather; but the *warmth of the poor man's cabin* ensures him an egg even in the most ungenial season. . . . Wherever you are within reach of steam-boats, you may calculate on having a brisk demand for fat poultry for the English markets, if those at home should not afford a sufficient price. Many a clever woman in the barony of Forth earns smart sums by rearing and fattening fowl for the Wexford market."

By the advantage derivable from the *warmth of the poor man's cottage*, the writer, we suppose, intends, as is common in Ireland, that fowls, pigs, children, and parents should all herd together around a turf fire, in a smoky cabin, mis-called cottage, which must necessarily be a receptacle for filth and a generator of disease. We by no means agree with him. It is, to say the least, a semi-barbarous plan, and one which no decent cottager in England, however poor he may be, would ever think of adopting. We acknowledge that fowls will not lay in winter without warmth and shelter, and, we may add, good and nourishing food. Warmth may be gained by erecting the hen-house so as to have the advantage of the flue of the kitchen chimney, or apartment in which the fire is kept during the winter—that is, it may be built, where convenient, on the outer side of the cottage, against the kitchen fire-place, the warmth from which will, in general, sufficiently maintain the temperature of the hen-house. The breeds to be selected are the Dutch everlasting layers, the black Poland, the Spanish, or a cross between the Spanish and Dorking. If well managed, the hens of any of these breeds will lay throughout the greatest part of the winter, or even the whole of the winter months. Fresh eggs in winter command a good price, and return an ample profit on the outlay upon food for the fowls. Some interesting experiments bearing upon this point have been made by Mr. Mouat, of Stoke, near Guildford. He received three pullets of the Poland breed on the 1st of December, 1835, which had been hatched in June previous, and they commenced laying on the 15th of December. The number of eggs which they laid between the 1st of December, 1835, and the 1st of December, 1836, was 524—that is, 175, 175, and 174 respectively—and one hen only showed a desire to sit. During the twelve months they consumed three bushels of barley, 17 lbs. of rice, and a small quantity of barley-meal and peas, the cost of which amounted to 16s. 10d. The number of eggs being 524, there were thirty-one eggs produced for every shilling expended. Assuming the weight of each egg to be one ounce and a quarter, there would be forty-one lbs. of food, of the most nutritious kind which it is possible to obtain, at the cost of less than 4½d. per lb.; or if these eggs, instead of being used for family consump-

tion, had been sold to the huckster, a profit would have accrued of at least 100 per cent.; for the trouble of attending to so small a stock of poultry scarcely deserves being taken into consideration. If the barley had been purchased in a larger quantity, it could have been obtained at 4s., instead of 4s. 9d., per bushel, and there would then have been thirty-six eggs for each shilling expended.

It must be observed, that during the moulting season in autumn, or at the latter end of summer, hens cease from laying, and in most instances, especially if old, do not recommence till the ensuing spring. There is, however, as we have intimated, a difference in different breeds, and with early-reared pullets, under good management (the breed being one of those above mentioned), eggs may be expected in December, and throughout the winter. The writer of a little work entitled *The Poultry Maid*, makes the following observations:—

"Some hens lay longer in the year than others, and some begin earlier. The cause of this difference is, that the hens are casting their feathers in the later seasons of the year, and some begin to moult sooner than others, and are longer about it. The old hens are slow in acquiring their new feathers (old age is never so lively in any process as youth), and do not begin to cast the old feathers as soon as the pullets do; but I may say, that from one month to three months, according to age and constitution, fowls are moulting and recovering the effects of it, during which an old hen, which is seldom full-feathered before Christmas, is very apt not to recommence her laying afterwards until March or April. By an old hen I mean one three or more years old; and, as she is then declining, you ought to fatten her for the table; for, if you let her run much longer, her flesh will be so tough that no one who is particular will like to eat of it. (We advise our readers never to place a hen of three years old on the table before company, nor at any time, unless constrained by necessity.) But you can have a constant supply of eggs in winter by taking care to have some pullets and fowls of different ages moulting at different periods, by which you will have a succession of eggs even in cold weather, if you keep the hens in a dry warm house, and feed them well with corn, hot potatoes, or thick porridge. Pullets' eggs are, to be sure, small; but then everything must have a beginning. Pullets hatched in spring, under a course of constant high feeding, will lay all through the autumn following, and be fattened, if not kept over for laying, against the Candlemas following. I have had 150 eggs from one pullet between February and October, and very often 120 from the 1st of March to the middle or end of August, when very

young hens generally begin to moult; but when this change of constitution takes place with them, some of the older ones will be laying perhaps till a late time in the season, and when they cease, some of the pullets will begin in their turn; so that by management in this way, having pullets and hens of different ages, eggs will be constantly obtained, if the effects of frosty or very cold wet weather be guarded against, by having *warm* houses in which the influence of the weather is not felt by the fowl."

From six young hens, well managed, nine hundred or even a thousand eggs may be expected from January to December inclusive. The eggs will average ten to the pound, and as eggs are much dearer late in the season, during the winter and in the spring, than at midsummer, £5 may be taken as a fair valuation. From this is to be deducted about 35s. as the cost of food; but then three broods, or even four, during the season, hatched under other hens, each brood consisting of ten chickens, or even eight, will not only pay for their own food, but that of the laying hens and sitters, and return a good profit besides. Spring chickens will sell in London, during the asparagus season, for six, eight, and ten shillings per couple; sometimes much more.

Many farmers, though fowls are kept on the farm premises in abundance, pay little attention to their feathered stock; their cattle or their corn-fields are all their care. "*Quid faciat lætas segetes, quæ cura boum,*"* are their objects of interest, nor are they to be blamed; but as a *large* stock of poultry is either profitable on the one hand, or the source of loss on the other, its management ought to be attended to by some one—the farmer's wife or daughter (provided the

boarding-school has not spoiled them), or by a poultry-maid. Profit should be aimed at, and profit may be and is obtained by those who understand the management of fowls. A short time since the wife of a respectable farmer and innkeeper at Home-wood, near Dorking, told us the amount of her profits on poultry during the spring and summer months, and it was a good round sum. She had conveniences for keeping fowls (ducks and geese also) *ad libitum*, and wisely availed herself of them.

In speaking of the importance of poultry in a national point of view, and of the profit which, under judicious management, it will bring to the farmer, the cottager, and those who have the conveniences for keeping a feathered stock, we have had the common fowl almost exclusively in our eye; but our observations apply also to geese and ducks, and, with certain provisos, also to turkeys. In the case of these birds, however, the profit is exclusively derivable from flesh and feathers. With respect to the Guinea fowl "much may be said on both sides." The peafowl is, in the present day, almost exclusively a bird of ornament, and kept for the sake of its extraordinary beauty. Pigeons are perhaps profitable under certain circumstances; but they are "huge feeders," and we advise the cottager to have nothing to do with them, unless he can make a profit by the rearing and sale of a few fancy birds, as we have known some persons do, who, be it observed, were well initiated in all the craft and mystery of the fancy business. Let it be known, however, that the keeping of fancy birds of all kinds involves great expense. Neither the farmer nor the cottager will trouble himself much about them.

CHAPTER III.

ON THE GENERAL TREATMENT AND MANAGEMENT OF FOWLS.

WHATEVER breed of fowls be selected for keeping, provision must be made for their comfort and safety. Fowls attached to farm-houses lead in many respects a happy life. They have good air and plenty of room, with no lack of food; they wander about the farm-yard and the straw-yard, visit the adjacent fields or paddocks, travel over the common or down the lane, troop around the barn, and enjoy total freedom. To the advantage of pure air they have that of pure water, and the opportunity of varying their diet

by picking up insects and their larvæ; and a store of pebbles, gravel, old mortar, and other calcareous matter which they require, is always at their command. So far it is well; but how are they housed at night? Often in a proper and well-built poultry-house, with perches judiciously arranged, and with baskets or boxes lined with straw for the hens; but often in places utterly unfitted for them. For example, at a farm-house which we had occasion to call at in Kent, we found that the fowls, which were numerous, lodged mostly under the thatch of a large open shed, above the waggons and carts, which received their

* How to make abundant crops, and how to manage cattle.

droppings in abundance; others took shelter in adjacent outhouses, and some in the stable. This want of order cannot be too much condemned—the hens having no proper laying-places, select such as chance may offer them, not unfrequently in obscure places of concealment, so that the eggs are lost. A safe and convenient fowl-house should be found in every farm-yard where poultry are kept, and the common fowls should have their exclusive dormitory. Farm-yard poultry are in general healthy and vigorous, nimble on their feet, and able with their wings. How different these to birds kept, as we have seen, to the number of twelve or more, in a space enclosed by lattice-work, not more than ten or twelve feet square, including their house or den, in which they huddle together, and in which a row of hen's nests is placed; how different these from the wretched-looking fowls to be seen in the streets of London, as in Monmouth Street and others adjacent, with dirty dishevelled plumage, pale combs, and dull eyes, and which dive for nightly shelter into the gloom of some damp unwholesome cellar, whence they emerge in the morning to pick up their subsistence in the kennel. The streets of London are no more fitted for fowls than was the blacksmith's shop for ducks, which, as the story goes, the man kept there to make the *smithy look rural*.

We do not, however, mean to say that fowls are to be kept only by farmers or cottagers; on the contrary, let the conveniences be present, and the number in accordance with the extent of range allotted to them, and then fowls may be kept with pleasure and profit. Those who intend to rear fowls should have a distinct yard, perfectly sheltered, on a large scale, with a warm aspect, well fenced, secure from thieves and vermin, sufficiently inclined to be always dry, and supplied with gravel, old mortar (not quick-lime), or chalk, and with sand or ashes for the fowls to roll in. Running water should if possible be provided, that is, a stream directed through the yard; but if this cannot be managed, a trough of water, fresh every morning, may be substituted; want of water, of which all poultry are fond, produces constipation of the bowels and inflammatory diseases. A contiguous field or paddock is moreover desirable. The fowl-house should be dry, well-roofed, and fronting the east or south, and, if practicable, at the back of a stove or stables—warmth being greatly conducive to health and laying, though extreme heat has the contrary effect. It should be furnished with two small lattice windows at opposite ends, which can be opened or shut at pleasure for the purposes of ventilation, which is frequently necessary. The perches should be so arranged that one row of roosting fowls should not be directly above the other; and a ladder of perches

should be constructed, so as to enable the fowls to ascend and descend without using their wings, for heavy fowls fly up to their roost with difficulty, and often injure themselves by flying down, as they come heavily to the ground.

Where fowls have the run of a wide, dry, sandy common, of an orchard, or of fields, and are able to procure clean water, a good poultry-house is all that is essential, though even then a yard or enclosure is desirable for the better management and safety of the young broods.

Though a poultry-yard should be open and airy, it should be sheltered from cold winds, and its soil should be dry. A simple shed, moreover, should be erected in some suitable spot, in order to afford a screen to the fowls from the hot rays of the mid-day sun in summer, and from heavy showers. Should there be no access to a paddock or orchard, it is desirable that a portion of the yard should be laid down with turf, and consequently the larger such a poultry-yard is the better. Cleanliness, both in the poultry-house and in the yard, is indispensable. "Cleanliness," observes Mr. Beaton (*Commissioner to the Board of Agriculture*), "with as free a circulation as possible, and a proper space for the poultry to run in, is essential to the rearing of poultry with advantage and success, as in narrow and confined situations they are never found to answer well." The same writer also remarks that nothing more is requisite for the keeping of poultry with profit and advantage beyond having a shed or light building formed in some warm, sunny, and, at the same time, sheltered situation, fitted up with proper divisions, boxes, lockers, or other contrivances, for the dwelling of the different sorts of birds, and places for their laying in. To this we may add, that partitions or cribs for the reception of sickly or diseased fowls are very useful. A sickly fowl ought to be immediately separated from the rest of the flock, not only because the disease may be contagious, but for the sake of the fowl itself. Pining fowls are very often objects of dislike, not only to the cock, who is apt to ill-treat the weakly or the suffering of his seraglio, but even to the hens, who evince their hostility and rancour in no very measured manner, sometimes to the positive destruction of their unfortunate companion.

The size of the fowl-house must of course be in accordance with the number of fowls kept. M. Parmentier (*Dictionnaire d'Agriculture*) has shown by what arrangement a house twenty feet long, and twelve feet wide, may be made to accommodate 150 hens at roost. The plan is simply this. The first roosting perch (rounded a little at the upper angles only, for gallinaceous fowls cannot keep a firm hold on perfectly cylindrical supporters), should be placed lengthways, and rest on tressels in each end wall, six feet from the

front wall, at a convenient height, which must depend on the elevation of the house from the floor, which latter must be formed of some well-consolidated material that can be easily swept. Another perch should be fixed, *en échelon* (ladder-ways), above this, but ten inches nearer to the back wall, and so on until there are four of these perches, like the steps of an inclined ladder, but with a sufficient distance between the wall and the upper perch to allow the poultry-maid to stand conveniently, when she has occasion to examine the nests, which it is her duty to do once at least every day, and in the forenoon. The highest of these she can reach by standing on a stool or step-ladder. By this contrivance the hens, when desirous of reaching the nests, have no occasion to fly, but merely to pass from one perch to another. If the size and form of the house permit, a similar range of perches may be made on the opposite side, care being taken to leave an open space in the middle of the room, and a sufficiently wide passage for the attendant to pass along the walls. It is not at all required to have as many nests as hens, because they have not all occasion to occupy them at the same time, and besides they are so far from having a repugnance to lay in a common receptacle, that the sight of an egg stimulates them to lay. It is however true that the most secluded and darkest nests are those which the hens prefer.

The nests, if built into the wall, are in tiers from the bottom to the top, the lowest being about three feet from the ground and a foot square. But if the laying chambers consist of wooden boxes, they are usually furnished with a ledge, which is very convenient for the hens when leaving the nest or entering it.

It is, however, generally admitted by all practically conversant with the rearing and management of poultry, that baskets of wicker-work are the best receptacles for the nests; they are cooler in summer, they can moreover be taken down and well washed and refilled with fresh clean straw. The lowest tier of baskets should be selected for such fowls as are selected for rearing broods, and they should be so arranged and placed that the hens can easily enter or leave them without disturbing the eggs; moreover, they should be screened from observation or possibility of disturbance. Wheat straw, or rye straw, should be used for the beds or nests, hay is too hot, and tends too much to the production of swarms of parasitic insects of the louse tribe, which render the nest uncomfortable, and not unfrequently cause the hens to forsake them. Dried heath, and dried fern leaves, especially the former, are well adapted for the same purpose as the straw. Where fancy fowls of different breeds are kept, each flock must have its own fowl-house, and its

own *run* or yard, otherwise a mixture of the breeds will infallibly take place; in fact, a sort of aviary is requisite, in the construction of which much taste may be displayed, not of course without a certain degree of expense, for this is an affair of luxury and ornament, not of mere profit. Of such a character is the royal poultry house or aviary for fowls at the Home Farm at Windsor. The building is of a semi-gothic style, and "consists of a central pavilion, flanked by roosting places, and breeding and laying nests. The pavilion is used as a spot whence the fowls can be conveniently inspected, and is surmounted by an elegant pigeon-house, remarkable for its lining of looking-glasses, in which pigeons delight to gaze, and before which they are constantly prunning and dressing themselves.

"The ground slopes in front towards the park, and is divided by slight wire fences into yards, as walks or places for the daily exercise of the fowl; these yards are laid out in gravel walks and grass-plots, the former leading to the entrance of the houses. The apartments are large and airy, the fittings and general economy of the house have been carefully regulated with reference to the natural habits of the birds, an equal temperature is constantly maintained, and in form and structure the nests are made to resemble the close and bramble-covered recesses which would form the dwelling of poultry in a state of nature."

Such aviaries are appropriate ornaments on the grounds or in the parks of the opulent, and their establishment tends to keep up the finer breeds of domestic poultry in their utmost purity. So far they are useful and laudable, but they are kept up to gratify the taste, profit being neither expected nor desired. A poultry-house with a view to profit, under the superintendence of a farmer's active and industrious wife, is thus described:—

"We had at the back of the kitchen and brewhouse, which formed one range and looked to the south, a paddock for calves or weanling lambs, and from this I fenced in forty square rods with a coarse wooden railing of slab-boards, not more than six feet high, but pointed at the top, which (as I found) prevented the fowls from flying over; three parts of it was left under grass, and the remainder was stripped of the earth and well covered with broken bricks and stones, over which gravel was put by degrees as fast as it became bound together, until at length it became a perfectly dry hard floor, that could be swept easily. In the middle I made a pond, which was constantly supplied with fresh water through a pipe from a stream that was near.

"For the sake of warmth the hen-house was built against the back wall of the kitchen, the upper gable of it being formed by a cross wall

which partly enclosed the paddock; it was merely a shed, ten feet long and six wide, covered in with coarse slab-boards, coated with pitch, and with a wide eave to throw off the rain cleverly, and high enough at the back wall to allow persons to walk along it from end to end without stooping. There was a door in the other gable wall, which was four-inch brick work, with a little sliding shutter at the top, through which the hens entered by a ladder from below, when they wanted to lay or go to their roosts, the uppermost of which was on a level with that little opening.

"There were little sleeping berths for ducks at the bottom. The floor, of well-tempered lime and clay, was raised about a foot above the level of the yard, to have it perfectly dry, and easily cleaned out every day, and the walls, being well plastered, were kept free from insects, cobwebs, and dirt of every kind, by pretty constant white-washing. This latter must not be omitted; for pure air is of great consequence, and this cannot be had if any foulness remains upon the walls, the floors, or the nests.

"To have plenty of thorough air, so needful in warm weather, there was a glazed window on hinges in the far-side gable, opposite the door, but well secured with an iron grating. There were also roosting-sticks, besides that which I mentioned near the roof, in the angles, wherever there was room for them, one above the other, but at different distances from the wall, so that the fowls did not stand exactly over each other.

"Some of the nests were square wooden boxes, put into holes picked out of the back wall, and near the ground, for the hatching hens to have the benefit of the warmth of the kitchen fire at their backs in the early spring time, when such additional warmth agrees with them. The other nests were of basket-work, hooked to the walls in convenient places, to be reached by the hens from a ladder, and with ledges for them to stand on, which prevented them from suddenly springing into their nests, and perhaps breaking the eggs that might have lain there from the day before. The basket nest can be easily taken down and washed; and this will be a great comfort to the hens, by preventing vermin from collecting. For the same reason, the beds must be changed very often. The boarded nests are preferable for hatching, as they are close and warm.

"The length of the back wall of the kitchen and office wall was so great, that I had other lodging-houses, too, with coops—one for fattening fowls, which should always be kept apart from the others, another for sick ones, and another very high one for turkeys, not closely enclosed, but with lattice-work in front, to give them plenty of air, which they delight in; and I had three little covered yards, a few feet square, latticed in front, with partitions of lath, lattice-wise also, for the

newly-hatched chickens, with sleeping-rooms inside them. As to the very few geese which I had, they either lodged on the floor of the turkey-house, or in little rude pens in one of the remote corners of the yard, which allowed room for little enclosures by movable hurdles, whenever any variety of broods required this accommodation, and we managed to let the younger broods roost by themselves.

"The houses being open by day, the turkeys and fowls could take shelter from rain, as they pleased; and to screen them from the rays of a hot sun there was fortunately a fine beech tree overhanging one side of the yard. All the floors were very frequently sanded, by which means they could be kept clean with very little trouble.

"Something of the above plan will answer for any family where expense and show are not desired; and if you have brooms, mops, feeding-coops, pans or bins for the different kinds of corn, and a roost and straw-house, and a lock-up place for the feathers of the poultry which you kill for the use of the house, you will have all necessary conveniences. The higgler who buys from you will save you the trouble of plucking. He has this benefit for himself, and, you may be sure, *feathers his own nest well* by this means."

The above plan (and all similar plans, whether more or less expensive) supposes that the poultry are to be secured from wandering. However great the range allowed them, they are still prisoners. They go over and over the same enclosed space of ground, which, in spite of every attention to cleanliness, becomes more or less unfitted for them, and more or less calculated to prove the source of disease. The healthiest fowls are those which have the free range of the farm yard, the straw-yard, the fields, the lanes, and the open common. They take as much exercise as they please, they search and scrape for grains and insects, amusing themselves as much as such creatures can do, and are ever lively and alert. They form regular habits with very little trouble on the part of the owner, trooping home to receive their evening feed, after which they seek their well-arranged dormitory, and rest quietly till day-break.

In order to keep fowls with advantage, attention must be paid to the relative number of the cocks and hens composing the flock. On this point there is some difference of opinion. M. Parmentier considers that one cock is sufficient for twenty hens, which in France, perhaps, may be the case, but not in our climate. Indeed it is found by experience, that, if the cock be placed over a numerous seraglio, the chickens produced are feeble, and the breed soon degenerates. The old breeders of game fowls allowed only three hens to one cock in his walk; and where the renova-

tion of a breed is required, this proportion should not be exceeded.

As a general rule, from eight to twelve hens may be assigned to one cock, but not more—nor, indeed, so many, if the fowls are kept in a confined yard, where the depressing influence of captivity will be more or less experienced. Mr. Bradley (*Farmer's Director*) lays it down as a law, that only seven or eight hens be allowed one cock, under any circumstances; and other writers of experience recommend that this proportion be not exceeded. In cold or humid districts, perhaps, this may be for the best; but in warm dry localities, where the fowls have a free walk, and are healthy, as many as ten or twelve hens may be safely allowed.

When there are two or more cocks, a little management will be required to prevent a succession of conflicts, which ought to be prevented. Where the cocks are of the same age, it is almost impossible to prevent their fighting; but one cock may be brought up under another, each in its turn gaining the ascendancy over the others. Suppose, for example, a stock of fowls intended to be numerically increased; their number is twelve, with a single cock at their head. Out of the young chickens hatched, a certain number will be selected for keeping. Among these should be the most promising and beautiful of the young cocks. When this new comer is a twelvemonth old, the previous bird will be two years old. The number may again, in like manner, be added to, till the stock is sufficiently numerous. When the old cock is past his fourth year, it will be advisable, generally speaking, to get rid of him (though for the table he will be useless), as he then becomes lazy, violent in temper, and excessively jealous. Should it be deemed necessary to introduce a new cock, a young bird should be selected, and introduced to the hens in the moulting season, when his older rival will take but little notice of him, and ultimately become reconciled to him by the time that the laying season commences, and, during this interim, he will ingratiate himself with a certain number of the hens, which will acknowledge his governance.

Where numerous fowls are kept, we have mostly observed that each cock has his own female train, which follows him, and is always at his call. The fowls are divided into parties or groups, and have each their favourite places of resort; hence they interfere less with each other than might be expected; but should a strange cock make a sudden appearance on the premises, he will have many a hard fight before he can establish himself, either in his character of a conqueror or a defeated champion.

Much has been said by some relative to the selection of the cock, but all their directions come

to one point. Whatever be the breed to which he belongs, he should exhibit the distinctive characters of that breed in full perfection; he should be bold, lively, clean made, with close glossy plumage, and a bright eye; his comb and wattles should be of rich vermilion; his crow should be clear, loud, and long-drawn; his breast should be broad and fleshy, his thighs muscular and firm, and his *tarsi* stout and armed with sharp spurs; his claws should be strong, slightly hooked, and sharp; and he should carry himself with a proud yet graceful air. We need not say that he should be in perfect health. We are now supposing that the chosen cock is to be introduced to no rival, but to a seraglio reserved for him exclusively. The question then is, what should be his age? We say from a year and a half to two years—not less than a year nor more than two years; for although some birds retain all their fire and energy until five or even six, still they are beyond their prime after the third, or at most the fourth year, and will then probably disappoint the breeder.

Some cocks, especially when they are getting past their prime, are unsocial, vicious, and tyrannical. Instead of scraping up delicacies for the hens, and collecting them around him by a clucking note of invitation, the surly bird attacks them without provocation, tears their combs, and otherwise greatly injures them. Let such a despot be deposed from his proud pre-eminence as soon as possible. On the other hand, a young cock in his prime will sometimes take a hatred to some particular hen, and though he treats the rest as becomes a gallant cavalier, towards her he exhibits a marked antipathy. In general, this dislike is manifested to aged hens, in which, perhaps, internal disease has begun to manifest itself. Hens, in fact, are frequently to be seen which have assumed not only the plumage, the hackles, and tail of the cock, but imitate him also, though imperfectly, in his crow. In these cases the power of reproducing eggs is invariably lost, owing, as has been fully demonstrated by Mr. Yarrell, to a diseased or schirrous condition of the ovaries.—See *Proceeds. Zool. Soc.*, 1831, p. 22; *Philosophical Transact.*, 1827; and also a paper, by Dr. Butter, in the *Memoirs of the Wernerian Society*, vol. iii.

Several cases of this kind in the fowl and the pheasant have come under our own personal observation, and in all were the ovaries diseased. We cannot, however, positively say from experience that hens thus diseased are invariably objects of hatred to the males; but such a fact is by no means improbable.

In the introduction of a fresh mate to a number of hens, care should be taken that he does not become their victim of oppression; for hens also

have their objects of dislike, and, unnatural as it may seem, sometimes fall upon a cock, presented to them in lieu of a predecessor, and dreadfully punish him. We believe that this strange conduct on the part of the hens occurs chiefly among flocks kept in confinement, and there are instances of hens, under such circumstances, taking a sudden dislike towards a cock with whom they have previously lived on the most amicable terms. An instance in point is noticed by Réaumur. In one of his coops he kept two hens and a cock. For a long time they lived together on the most amicable footing, and the hens produced fertile eggs. Suddenly, however, and from no apparent cause, they exhibited a total alteration of feeling, and became hostile in the extreme towards their lord and master. They attacked him with their beaks, and pecked his head till they not only stripped it of feathers, but tore the skin. The poor bird, in the meantime, endured their assaults without attempting to retaliate, or scarcely even to avoid their fury. For five or six days did they continue this unnatural conduct, until death released their victim from his misery. Réaumur, after removing the slain bird, substituted in his place a young, vigorous, and most beautiful cock, hoping that he would be received with the courtesy due to his merits. But no, the hens seemed possessed by some evil spirit. They attacked him as they had done the former, and, had he not been removed, would have killed him in like manner. Two other cocks in rotation experienced a similar reception; nor could these hens ever afterwards be induced to recognise the authority of a sultan. We cannot help suspecting that, in this case, the confined hens had begun to suffer under ovarian disease, which induced a total revulsion of natural feelings and instincts, and prompted a line of conduct apparently capricious, but really in accordance with the laws of nature, which dictated sexual separation. Had these hens been at large among a flock, probably they would have been neglected or assaulted by the cock. As it was, confined with him, they attacked and overcame him.

As in case of other birds, nature designs that every hen shall sit upon her own eggs, and hatch her own progeny; but the domestic hen is in an artificial state, and deviations from the laws of nature are therefore to be expected. A wild hen will lay no more eggs than she can conveniently cover, and her periods for laying and for incubation will be fixed and regular. On the contrary, domestic hens lay many more eggs than they can cover. Some lay every day, or every other day, for nine months out of the twelve, and never or rarely evince a desire to incubate; while others evince this desire, some at one period, others at another period. Among a flock of hens these diversities will show themselves, and ad-

vantage may be taken of them with benefit to their owner. A hen prompted by instinct to the task of incubation, asks only for eggs suited to her size, be they those of her own production or not (those even of a duck will be accepted), a nest, and undisturbed solitude. At this juncture, she utters an instinctive cluck, ruffles her feathers, wanders about, searches obscure corners and recesses, and is evidently ill at ease. She is feverishly hot, impatient, and anxiously restless. In high-fed hens this instinctive desire comes on sooner than in such as are not supplied with food in abundance, and it may be induced by stimulating diet, such as bread steeped in ale, a little raw liver or fresh meat chopped small, potatoes mashed warm, with milk and oatmeal. Some farmers recommend a fomentation of vinegar in which pepper has been steeped, to be applied to the under parts, as a means of inducing this desire; and others even advise that some of the feathers of the abdomen be plucked off, and the skin stung with nettles. Such means may induce fever, and a desire to cool the inflamed skin by applying it to cool substances but not a genuine natural impulse to fulfil the great law of nature. Let them never be put into practice. They are barbarous and contemptible. By high feeding, some hens, especially of the Dorking breed, which, as sitters, take the pre-eminence over all other breeds, may be induced to sit in October, especially if they have moulted early. Advantage may be taken of this circumstance, and chickens may be obtained fit for the table by Christmas—not, however, without great care and trouble, as in the case of house-lamb, ready at the same season. The incubation must take place, and the chickens be reared and fed, in a warm room, kept at an equal temperature. Generally speaking, spring chickens are more desirable which should be hatched in January, so as to be ready for the market in the latter part of March, and through the months of April, May, and June. They require great care, but they return an ample profit, selling at eight or ten shillings per couple, sometimes even more.

The most usual time in which hens manifest a desire to incubate, extends from March to May or June, and at this season chickens may be reared without any extraordinary precautions. The hens selected should be of large size, well feathered, with short legs, and of mature age. The number of eggs allotted to a single hen may vary from twelve to fourteen, but should never exceed the latter number. It is by no means uncommon with experienced breeders, to place two hens on the same day, on their respective eggs, and then on the twenty-first day, when the broods come forth, to give the maternal charge of both to one of the hens, removing the other to a fresh

set of eggs, which, if she be a steady sitter, she will hatch, as in the first instance. This, however, must be deemed a cruelty; it is well known that some hens would sit until they became so feeble and emaciated as to be restored with difficulty. What then shall we say to those who make a hen sit several times in succession, and that by constraint, as did a French lady, Maddle. de Portebois (see Art. POULE, in *Encyclop. Méthodique*). Markham is wrong when he states his opinion that long sitting does not injure the hens. To sit twice is a tax on the system, and no one but a person dead to feelings of consideration for the lower animals, would permit a hen, however constant to her task, to sit three or four times.

A proper supply of food and water should be placed so as to be readily accessible to each hen during her period of incubation, but she should not be fed upon her nest; let her be left to instinctive guidance. At due intervals she will leave her eggs for a minute, feed and refresh herself, and return with renewed strength to her eggs, over which she broods with feelings of satisfaction. Officious interference cannot be too much condemned.

In selecting eggs for hatching, care should be taken that they are not above a fortnight or three weeks old, they should be of large size, and heavy, and with one end smaller than the other; large rounded eggs are apt to contain a double yolk, and to produce monstrosities. If the eggs are all of the same age, to a day, the better. It has been asserted that the sex of the bird to come from each egg is indicated by the shape of the latter—those with the small end blunt, producing females; and those of an oblong shape, males. A writer on poultry says, "Sketchley tells us that he has always found the round egg to contain the female chick, and that of oblong shape the male. This, however, though it may have been newly discovered by Sketchley, was known to Columella and Stephanus." This is contradicted, and with sufficient reason, as we believe; and not only is it impossible to foretell the sex, but even to ascertain with certainty if the egg be fecundated. The same writer to whom we have alluded says, "If you examine the egg between your eye and a candle, you will be able to discern the position caused by the little air-bag at the blunt end of the shell. If this be in the centre, the egg will produce a cock; if at one side, a hen." How far this test is to be relied on, we do not know; but according to this theory, the position of the air-cell will be different in rounded and acute eggs, the former containing females, the latter males. We can only say we have seen no facts which lead us to receive it with implicit confidence. But this we know, that if the air-cell at the obtuse end of the egg, the purpose of which is to oxygenate the

blood of the chick, be perforated, even in the least conceivable degree, the vitality of the embryo is at once destroyed.

The structure of the eggs of birds, clearly exemplified in that of the common fowl, and the progressive development of the chick, are subjects which, though familiar to the scientific, are not generally understood. We have known some who have regarded the air-cell as the germ of the chick, and others the yolk or *vitellum*; while most consider the shell as an impervious covering. We may here give a little information on these points, which will not, we hope, be unacceptable. The external superficies of an egg consists of a shell of particles of lime, deposited around the white or albumen, in the last dilated portion of the egg duct. Now this external shell, though important as a safeguard, is not one of the essential constituents of an egg, therefore we shall consider it the last. We must first begin with the formation of the egg. The egg is first formed in the egg-producer or ovary, and this ovary is single and on the left side of the spine—or to speak more correctly, although there are two egg-producers, that on the right generally remains undeveloped, or, as it were, in a state of permanent atrophy. The fertile ovary or egg-producer (*ovarium*), attached by folds



OVARIVM OF FOWL.

of peritoneal membrane to the spine, presents an appearance something like a cluster of grapes—only that the eggs, which are connected together by narrow pedicles, are of different sizes, according to their different degrees of development. The *ovarium*,

therefore, is racemose, consisting of a number of pedunculated *ovisacs*, each producing its own egg or *ovulum*. Each *ovisac* consists of two membranes; the external is vascular, and surrounded by a pale zone (apparent in those of larger development), which is termed the *stigma*. The lining membrane of the *ovisac* is very thin and pellucid, but studded on its inner surface with granules, probably of a glandular nature. Within these *ovisacs* are the eggs, or rather the *ovula*, essentially formed. When considerably developed each *ovulum* consists of an orange yellow and somewhat oleaginous matter, or yolk (*vitellum*), enclosed in a membrane of exquisite delicacy. Upon the surface of this yolk is to be seen an opaque and slightly elevated spot, called *citricula*, wherein is lodged the reproductive but as yet unvibrated germ, appearing in the form of a most minute transparent globule, the germinal vesicle, called after its discoverer the *vesicle of Purkinje*. The *ovulum* thus constituted ripens, as it may be said, and attains its full development—fecundation takes place, the *ovisac*, previously thinned by absorption, becomes ruptured at the zone or *stigma*; and the *ovulum*, covered only by its own delicate membrane (*membrana vitelli*), is received by the expanded or funnel-shaped opening of a tube called the *oviduct*. During this transfer the *vesicle of Purkinje* disappears, probably it is ruptured, and its inclosed germ takes its station in the *citricula*, which has lost something of its previous appearance, and is now called *blastoderm* (*βλαστος*, a germ, and *δερμα*, skin, that is, the skin enveloping the germ, or the germinal membrane). From this *blastoderm*, a narrow canal leads to a chamber in the centre of the yolk, which is filled with a whitish granular substance.

Received into the *oviduct*, the yolk becomes gradually enveloped in glairy fluid or *albumen*, added layer upon layer and secreted by the mucous membrane which lines the upper part of that canal. Besides the ordinary *albumen* or *white*, transparent longitudinal strings of inspissated *albumen* are deposited, the future use of which is to suspend the *yolk* in the *white*, keeping it in its place, turned about as the egg may be. These cords are termed *chalaza* (*χαλάζω*, to suspend), and first appear in the form of membranes, which gradually gather into two delicate spiral cords.

The yolk, now invested with layers of *albumen*, advances still farther in the *oviduct*, and now gains a denser but thinner covering, which consists of two layers of a fine parchment-like tissue. First one layer is thrown over the *albumen*, and then the other, but the last is at the larger end of the egg, separated from the former, leaving a space called the air-cell or *vesicula aeris*, filled with oxygen, or at least with air containing an unusual proportion of oxygen. This double membrane is called the shell-skin or *membrana putaminis*.

With the exception of the shell, the egg is now complete. It passes onward, and in the latter portion of the *oviduct* the *membrana putaminis* becomes coated with a deposit of calcareous particles forming the shell, to which, in many birds, colouring matter, the secretion of certain minute glandular pores, is added, producing various patterns or styles of marking. Being now finished, the egg passes from the *oviduct* into the dilated *cloaca*, its last receptacle, and is ready to be deposited in the nest.

Such is the progress of the egg from the *ovarium*. We may, however, remark, *en passant*, that the domestic hen, and indeed other birds, as canaries (perhaps even wild birds), will often lay eggs even in considerable numbers, although all access of the male is debarred. Such eggs have no vital principle, there is no germ requiring only warmth for its development, and they quickly become putrescent. They are mere *exuviae*.

And now to return to the shell. It is composed of particles of lime, extremely minute and of a polygonal form, so as to produce by their accumulation a delicate crust, which, smooth and close as it may appear, is nevertheless, from the form of its composing particles, pierced by exquisitely fine pores. It is therefore consequently permeable by air (as are the membranes lining it), and this the more so as the shell becomes thinner during the progress of incubation, in consequence of absorption. Hence, in proportion as the chick requires a more and more free admission of air into its prison, so a more and more free admission is gradually effected, till at last before exclusion its feeble chirp may be heard, proving that the process of respiration goes on freely. In fact, the shell during incubation not only becomes lighter but more brittle, and the lining membrane at the same time becomes partially separated.

If a new-laid or fresh egg be plunged into boiling water, or hot water, its surface will instantly become covered with minute globules of air escaping through the pores of the shell; and, as the 'Poultry-maid' tells us, that if, in roasting an egg in the wood ashes or embers on the hearth (as we have seen done many a time in France), drops of moisture ooze out to the surface, the egg is fresh;—two facts proving the porosity of the shell. Eggs destitute of shells are not unfrequently laid; they are called soft eggs. In these cases the hen is weakly, or debarred from calcareous matter, as chalk or old mortar, which is demanded by the system; at all events, the lower portion of the *oviduct* has failed to secrete the necessary supply of lime.

A perfect egg when laid consists, therefore, of the shell with its double lining, enclosing the air-cell; the *albumen* or *white*, with its *chalazas* or cords running longitudinally from an expansion

thrown over the yolk, or rather over the *membrana vitelli*; the yolk, invested in its delicate membrane, and exhibiting the germ, the canal, and the central cavity filled with granular matter.

The yolk forms the nourishment of the developing chick. With respect to the white, which consists of two or perhaps more layers, distinct from each other by the intervention of an invisible film, various opinions have been formed. Dr. Paris regards it as designed to regulate temperature: "The *albumen*," he remarks, "being a most feeble conductor of caloric, retards the escape of heat, prevents any sudden transition of temperature, and thus averts the fatal chills which occasional migrations (departures from the nest) of the parent might induce." This is not improbable; but as more than one effect results from single causes in most of the plans and operations of nature, we may adduce two other benefits resulting from the presence of the albumen. First, it acts as a defence to the yolk, allowing it to float at liberty, but beautifully suspended, inasmuch that the germ is always uppermost, however the egg be turned about. Were the yolk enclosed only in the shell, this could not take place, and moreover every slight jar would be communicated to the tender germ. Hence, then, the *white* is essential to the preservation of the yolk and its embryo. Again, there must be room in the egg for the due development of the chick before exclusion. This, for the reasons above stated, independently of others, cannot be effected by the extension of the yolk, so as to fill the cavity of the shell, but most appropriately by the envelopment of the *white*, which acts as a regulator of temperature, and a safeguard in every contingency; it gives amplitude to the shell, it defends the yolk, it ensures uniformity of temperature. But we must follow the phases of the germ-bearing egg. It is destined either to become abortive—to perish, or to give to light a living being. Warmth alone is required for the commencement, carrying out, and completion of the process, by which, "*ex ovo*," an active creature will emerge as from a tomb.

The changes which the chick undergoes in the egg during the process of incubation have engaged the attention of many philosophical naturalists, who have given the minute details of every phase. A brief sketch of the mode of development presented by the chick from the first day of incubation to the twenty-first is all that we shall here attempt.

After the lapse of about *twelve hours*, during which time the hen has been sitting upon her eggs, a change is perceptible in the appearance of the *blastoderm*, which becomes separate from the yolk and the *membrana vitelli*. It has begun to spread, assuming the form of a central pellucid

spot, surrounded by a dark ring. It is moreover somewhat prominent, and on microscopical examination is found to consist of three layers; of these the external is a *serous layer*, below this is a layer of *vascular tissue*, and beneath this, and next to the yolk, is a *mucous layer*. The spark of life is kindled, for from these three layers the development of the chick proceeds. From the first layer all the serous structures originate, from the second the vascular system, and from the third or innermost all the mucous structures.

At the commencement of the *second day*, the embryo is still more developed, and at its anterior portion the membranes of the *blastoderm* are bent inwards, assuming a *sigmoid* flexure, which at the close of the *second day* becomes still more apparent, while from the *vascular layer*, at its flexure, a little *pulsating cavity* is developed, and this *punctum saliens* is the commencement of a heart.

On the *third day* the *serous membrane* will present a decided alteration in appearance; it extends considerably over the back of the embryo, and is reflected over its two extremities, and forms in fact the commencement of the *amniotic sac*.

The *mucous layer* is no less altered; it extends as a lining along the under surface of the embryo, destined to become the abdominal cavity, and it gives birth to the rudiments of the abdominal viscera.

The *punctum saliens*, given off from the *vascular layer*, is also more advanced in development; it has assumed the character of a heart consisting of two chambers, from which are given off arterial vessels, the branchial arteries, consisting of four arches on each side, which unite to form the *aorta*. In connection with the development of the *aorta*, another change is commencing—the *allantois*, allantoid sac, or sac of embryotic respiration, begins to manifest itself.

On the *fourth day* the pupil of the eye can be distinguished, and also the aqueous and vitreous humours. Five vesicles, filled with a fluid, appear on the head, which afterwards coalesce and form a brain, invested with its membranes. The wings and thighs have begun to bud, and the *allantois*, or vascular membrane, proceeding from the navel, is developing. The spine assumes a distinct form, and the double cord of the spinal marrow is apparent.

At the *fifth day* the lineaments of the viscera become tolerably distinct, the sac of the *amnios* is completed, the liver and the lungs are clearly discernible, and the bag of the *allantois* is largely developed. Still, however, the heart is that of a fish, and the *aorta* is formed by the union of the branchial arches. As, however, the lungs increase in size, the circulating apparatus becomes greatly changed, and the branchial organs obliterated, the heart by degrees assumes its true form, with its

ventricles and auricles, and its system of arteries and veins. At this period a *true* aorta does not exist, nor is a *pulmonary* artery yet established. The *present* aorta, as in fishes, is formed by the union of the branchial vessels, and the heart is imperfect. Its perfection is gradual, and completed only after the chick has breathed for a few minutes the atmospheric air; when the *ductus arteriosi* become imperforate, and a distinct *systemic* and *pulmonic* circulation are established. We might indeed here pause to trace out, step by step, the wonderful metamorphosis which takes place in the vascular system of the chick, from its incipient stages till it leaves the egg, but as this plan would lead us too far from our main subject, and involve our readers in a labyrinth of anatomical details, we shall forbear—we can only generalize.

On the *sixth* day the embryo has acquired a still further degree of development, which continues till, on the *ninth* day, the bones begin to be formed, and the yellow vessels on the yolk bag show themselves. The yolk constitutes the food of the chick. "About the hundred and twentieth hour from the commencement of incubation, the *vascular* layer of the *blastoderm* has spread extensively over the yolk, and as the vessels formed by it become perfected they are found to converge to the navel of the embryo, and to constitute a distinct system of arteries and veins (the *omphalo-mesenteric*), communicating with the aorta and with the heart of the foetus, and forming a vascular circle surrounding the yolk. The *omphalo-mesenteric* arteries, which thus ramify over the vitelline sac, are derived from the *mesenteric* arteries, and the blood distributed through them is returned by the *omphalo-mesenteric* veins to the superior *vena cava* of the young chick.

"As soon as the intestinal system of the embryo bird is distinctly formed, the *membrane* enclosing the *yolk* is seen to communicate with the intestine by a wide duct (*ductus vitello-intestinalis*), whereby the nutritive substance of the *yolk* enters the alimentary canal to serve as food, and the mucous membrane lining that which encloses the yolk (or the *vitellicle*) becomes thrown into close wavy folds, so as to present a very extensive surface. Gradually as growth advances the yolk diminishes in size, and at length, before the young bird is hatched, the remains of it are entirely withdrawn into the abdominal cavity, where its absorption is completed; but even in the adult bird, a little cecal appendage or diverticulum indicates the place formerly occupied by the *ductus vitello-intestinalis*.

"While the above phenomena are in progress, another important system of vessels, provided for the respiration of the bird *in ovo*, is developed, and obliterated before the egg is hatched. About

the fifth day the sides of the abdominal cavity, which is still open anteriorly, are occupied by transitory secreting organs, named *corpora Wolfiana*; these apparently are the rudiments of the genito-urinary system, and to receive their secretion a bladder is developed, called the *allantoid sac*, a viscus which is moreover destined to play an important part in the economy of the embryo, and soon becomes its principal respiratory organ. The *allantois* first makes its appearance as a delicate bag, derived from the anterior surface of the rectum, but it expands rapidly, and soon occupies a very considerable portion of the interior of the egg, until at last it lines nearly the whole extent of the *membrana putaminis* (or shell membrane), and becoming thus extensively exposed to the influence of the air that penetrates the egg-shell, it ultimately takes upon itself the respiratory function. When fully developed it is covered with a rich network of arteries and veins spread upon its surface. The arteries are derived from the common iliac trunks of the embryo, and of course represent the umbilical arteries of the human foetus; the vein enters the umbilicus, and passing through the fissure of the liver, pours the blood which it returns from the *allantois* in an arterialized condition into the inferior *vena cava*, as does the umbilical vein of mammalia."—JONES.

If on the *twelfth* or *thirteenth* day, this allantoid membrane enveloping the *white* of the egg be examined, by very cautiously opening the shell, it will present one of the most splendid spectacles that can be imagined—the most simple and at the same time the most perfect substitute for the lungs. It exhibits a surface covered with countless blood-vessels, venous and arterial, branching through its tissue. The veins are of a bright scarlet colour, carrying oxygenated blood to the chick, while the arteries on the other hand are of a livid red, bringing the carbonated blood from the body of the chick to be renovated and purified on this temporary pulmonic membrane. Thus the functions of the two sets of vessels are subservient to the rapid growth of the enclosed embryo, of which the limbs, the head, the beak, and the feathers, are now shooting forth vigorously.

Still, though the lungs are now, in a forward condition, they have not yet taken in air, but on the eighteenth or nineteenth day of incubation, the air-vessel at the large extremity of the egg becomes ruptured, the chick feels the stimulus, it takes an inspiration, it begins to breathe, and utters a chirping sound distinctly audible. From this moment the circulation begins to flow in a new course. It diminishes by degrees in the *allantois*, this membrane is no longer of importance, it has performed its task, and the lungs have commenced theirs; consequently its obliteration

tion now begins, and is continued until a ligamentous remnant called the *urachus* is all that remains to indicate its previous existence. The twenty-first day arrives; the chick is about to emerge from its living tomb. But what is its position in that oval case, and by what means does it emerge into this "breathing world," there to pass its allotted date of active existence?

The chick (to answer the first question) is packed in its shell in the most snug and compact manner imaginable. It is rolled up almost like a ball; the legs, occupying the narrower part of the shell, are drawn up, and the neck is bent down, with the head thrust under the right wing, the tip of the bill emerging, and just touching the shell, near the magnitude of the large or obtuse end. Animals sleeping naturally and in health, generally, as it appears to us (and we hazard an opinion), assume something of the position which, in the womb, or in the egg, they then exhibited. The bird, sleeping on its perch, assumes a crouching attitude, and buries its head under its wing. On this point, however, we shall not enlarge. Thus boxed-up, the chick, with its beak applied to the greatest circumference of the shell, is, strange as it may seem, in a position most favourable for self-extrication—for, contrary to what some suppose, the chick frees itself by its own exertions, and not by the aid of the mother, as many have imagined from the fact that pieces of the shell are often broken off while the membrane within remains still unruptured. But this results from the circumstance of the membrane being yielding and elastic, while the shell is rendered thin and brittle by the process of incubation; the latter, therefore, breaks while the membrane stretches.

Although Albertus Magnus, a naturalist of the thirteenth century, seems to have understood the mode in which the chick makes its exit, still it was reserved for later zoologists to demonstrate the process. It might be supposed that the labour of breaking forth from the shell was much above the strength of the yet feeble chick; and so perhaps it would be, did not circumstances conspire to render the chick, feeble as it may be, still adequate to its instinctive task. Its position, as we have intimated, gives it an advantage; its beak, although soft, is applied to the part of the egg most liable to yield; but, what is more, it is furnished with a little appendage which greatly contributes to its efficiency. The use of this appendage was first, if we mistake not, pointed out by that observant naturalist, Mr. Yarrell. "Upon the curved part of the upper mandible, just above the point, there will be seen a small horny scale, nearly circular, having at its centre a hard and sharp projecting point. By the position of the head, this sharp point is brought into constant contact with the inner surface of the shell." When the chick

escapes, and the beak hardens by exposure to the air, this hard pointed scale soon falls off; and on the second or third day, a light-coloured mark only is observable on the spot it had occupied. In pigeons and other birds which are far less mature than the young fowl when excluded from the egg, and which remain long as nestlings, this horny point remains for six or eight days. It is very probable, as Mr. Yarrell observes, that the hardness of this bill-scale may be proportioned to the thickness of the shell; for in the chick of the Egyptian goose it is not only extremely prominent but very hard and sharp. It is worthy of remark, that on the beak of the very young *ornithorhynchus* (an ovo-viviparous quadruped, *monotremata*) a similar horny scale exists.

In its natural position within the egg, the chick lies with the point of its beak uppermost. At first, the superior weight of the body on the contrary side will naturally, though the egg may be turned, cause the chick to revolve; but afterwards, when the chick is ready to break the shell, it has the power of altering its own position, as far as a revolution from left to right is concerned, without a reverse of relationship to the shell. It can, in fact, work at the shell in a circular method, not by pecking so much as by scraping with the bill-scale, the head under the wing being moved backwards and forwards.

Réaumur, who conducted many experiments with a view to elucidate the history of the chick *in ovo*, states that he has frequently heard the imprisoned creatures at work upon the shell with their beaks; and in the more advanced stages of the operation, he could see them with considerable distinctness, by the aid of a candle, through the shell and transparent membrane. In due time, a small crack is produced—though, as yet, the membrane is unbroken; and this crack is gradually extended, till the circle is complete or nearly so, and the membrane also ruptured. During this process the chick gradually turns round, applying its bill in regular progression to the circumference of the shell, cutting, or rather chipping, it directly across. The revolution, as already stated, is from left to right, and appears to be performed by the efforts of the legs, aided perhaps by a wriggling movement of the body generally. Réaumur was inclined to think that the reaction or pressure resulting from the strokes given by the bill upon the shell would be sufficient to produce a gradual alteration in the position of the chick; but he was obliged to alter his opinion—experiment proved it erroneous. "Is it," he writes, "contrary to probability that the strokes of the bill upon the shell exert a reaction on the body of the chick sufficient to alter its position, and turn it by little and little round the circle? A plain experiment seemed to me directly calculated to put this to the

test, and on this principle, that, granting the idea to be correct, the chick would not be able to turn itself if the bill were so placed as to have nothing solid against which to press—a condition easily produced by taking from the bill that solid resistance against which it was supposed necessary for it to act, namely, by carrying on the fracture towards the right, so that the bill might have nothing to strike against. Accordingly, I carried on the small fracture, made in two different eggs, by taking off pieces both of the shell and membrane as far as I went, purposely to see what would happen to the chicks.

“Now, unfortunately for the theory, the consequence was that each chick was sooner released from confinement than if it had had to effect its own exit. I had, in fact, saved each chick part of the work, and it well knew how to change its place so as to be able to break the remaining portion of the shell.”—*Oiseaux Domestiques*.

In a state of nature, we suspect every bird, while a chick in the egg, performs according to its species the operation necessary to extricate itself in a definite or determinate time. In domestic birds some little variation may be expected according to the vigour of the chick, which depends greatly upon the health and condition of the parents. Certain it is that all chicks (we allude to those of domestic poultry) do not produce the same result in the same space of time, the period of labour within the shell varying from one, two, or three hours, to more than twenty-four. “I have seen,” says Réaumur, “chicks continue at work for two days together; some work incessantly, while others take rest at intervals, according to their physical strength. Some, I have observed, in consequence of their impatience to see the light, begin to break the shell a great deal too soon; for, be it observed, they ought, before they make their exit, to have within them provision enough to serve for twenty-four hours without taking food; and, for this purpose, the unconsumed portion of the yolk enters through the navel. The chick, indeed, which comes out of the shell without taking up all the yolk, is certain to droop and die in a few days after it is hatched. The assistance which I have occasionally tried to give to several of them, by way of completing their deliverance, has afforded me an opportunity of observing those which had begun to break their shells before this was accomplished; and I have opened many eggs much fractured, in each of which the chick had as yet much of the yolk not absorbed. Besides, some chicks have greater obstacles to overcome than others; since all shells are not of an equal thickness, nor of an equal consistence, and I think it probable that the same inequality takes place in the lining membrane. The shells of the eggs of birds of various species are of a thickness propor-

tionate to the strength of the chick that is obliged to break through them. The canary bird would never be able to break the shell it is enclosed in, if that were as thick as the egg of a barn-door fowl. The chick of a barn-door fowl again would in vain try to break its shell if it were as thick and hard as that of an ostrich; indeed, though an ostrich ready to be hatched is perhaps thrice as large as the common chick, it is not easy to conceive how the strokes of its bill can be strong enough to break a shell thicker than a china cup, and the smoothness and gloss of which indicate that it is nearly as hard, sufficiently so to form, as may be often seen, a firm drinking-cup. It is the practice in some countries to dip the eggs into warm water at the time they are expected to chip, on the supposition that the shell is thereby rendered more fragile, and the labour of the chick lightened. But water, even at the boiling point, does not render the shell more fragile; and though the water should soften it, upon drying in the air it would become as hard as at first.” The action of warm, or even of boiling water, upon the egg is ineffectual as far as the softening of the shell is concerned; but, as we have already observed, the shell becomes thinner and more brittle during incubation, and consequently more ready to yield to the efforts of the enclosed chick, inasmuch that if it be not completely separated into two parts before the chicks attempt to emerge, the end, or lid as we may term it, readily gives way before the efforts of the little prisoner as it pushes itself forwards. Generally the anterior part of the shell is thrown on one side, but not always, for sometimes it appears in a very curious position, namely, fitted into the larger portion of the shell, as one cup or basin may be placed within another; only that it is not, and of course cannot be, pressed home to the small end—it fits into the shell as far as it can go. This position is, to a certain degree, accidental; it is produced by the undesigned efforts of the chick, which, liberated from its prison, and stepping upon the down-wrenched gate, causes this portion of the shell by its movements to slip under it, and enter, as far as size will allow, within the hollow of the evacuated prison, its convexity foremost. In the case of birds which long remain helpless in their nests, no such occurrence, as far as we can tell, takes place; certainly it does not with pigeons, nor with sparrows, and the warblers of our hedge-rows and copses. The parents in these instances remove the shell in their beaks, and drop it at a distance; pigeons merely turn the shell out of the nest, at least according to our own experience; but then pigeons are semi-domesticated: perhaps the wild birds remove the fragments of their eggs in the ordinary manner.

Let us now suppose that the chick has opened the door of its egg. Feeble trembler, on the verge

of an unknown state of existence, what are its sensations! Had it but reason, how applicable to it would be Buffon's eloquent description of man, springing up at the bidding of his Creator into life and light, at once enraptured, perplexed, and bewildered. But the chick is guided by instinct, and by instinct alone; it has nothing to learn, no ideas to be conceived through the medium of the senses, and yet it is interesting to watch it at this juncture. It is free; the first thing it does, while yet on the threshold of the egg, is to draw its head from under its wing, and to direct it forwards, the neck trembling beneath the weight which it has now for the first time to sustain. With its neck stretched forwards, and scarcely able to raise itself on its legs, it rests for a few minutes, till its strength be recruited; the fresh air revives it, it raises itself up, it lifts its head, it turns its neck from side to side, and begins to feel its innate powers. Its downy plumage, the precursor of feathers, being wet with the fluid of the egg, lies close to the skin, in stripes down the body and on the wings; besides, it is not yet fairly free from the sheath in which every plumelet is enclosed. As it dries, every tuft expands, or opens, like a feathery flower; the little membranous sheaths split and fall off; and the chick rises in its nest, clothed with a downy garment of exquisite delicacy.

Occasionally perhaps among wild birds there occur instances in which chicks perish in the egg, unable to extricate themselves from the shell and membranes—we say perhaps—but if our own experience does not deceive us, such instances not unfrequently occur; the chick is dried or glued to its shell, and, unless assistance be given, will infallibly perish. In the case of the wild bird assistance is out of the question; but in her great course, Nature designs the strong alone to live and perpetuate the species. If this accident occurs among wild birds, much more frequently, as might be expected, does it occur among our domesticated stocks. "In order," says an anonymous writer, "to understand how a chick may be thus glued to the shell, it will be necessary to recollect that between its body and the lining membrane is the *white* of the egg, a glairy adhesive fluid, which by drying becomes a sort of cement, very apt to cause the feathers to adhere to the membrane with which they are in contact. The chick of an egg which has been, in artificial hatching, subjected to a temperature too high, is in the most danger of such an accident; though it seldom happens before the chick has made a pretty large breach in the place first *chipt*, and has also rent the membrane, after which operation it remains a good while at rest. The air introduced through this rent soon changes the white fluid next the margin of the aperture into a hard

tenacious glue; and this exsiccation of the white is extended, so that when the chick is desirous of returning to its task it can only peck at the same place, being held fast from moving its body by the glue. Its attempts pull the feathers and make it squeak, and as its efforts are more and more painful, the desire to move is abandoned. Under such circumstances, the chick, if unassisted, must die; and hence it may not be useless to point out the indications by which this state of things may be recognised. Whenever, then, a considerable fracture both of the shell and the membrane is observed to remain for five or six hours without enlargement; and, at the same time, the margin of the membrane is perceived to be hard and dry, with perhaps some feathers sticking to it, it will be indispensable to liberate the chick by breaking the shell very gently, and by cutting the membrane with the points of a pair of scissors. The operation, though painful to the chick, does not prove mortal, for the young animal is no sooner freed than it exhibits as much vigour as any other chick of its age." This last observation does not agree with our own experience; inlead we have known many chicks die after extrication from the shell, even by the most delicate manipulation, their vital powers being under par. Debility alone is the cause of this misfortune; the chick has not the strength sufficient for the work it has to accomplish in the space of time within which it ought to be performed.

The later eggs of a hen are more liable to this casualty than those laid at the commencement of the season, and as we have some reason (from observation) to believe, the last egg laid by a wild bird in her nest (and we have particularly the hedge-sparrow or duncock in our eye) is more apt to become a failure, from the chick on the eve of extrusion sinking under debility, than any one of the eggs laid previously. Yet this theory we advance with some hesitation, for we found our opinion chiefly upon observations on the eggs of hedge-sparrows whose nests were built in our own garden, the same pair coming year after year to a favourite spot, and their progeny selecting adjoining sites of nidification. Of this however we are positive, that dead younglings sticking to the shell have been picked up by us close to the nest on which the half-tamed parent would sit, unscared by our derangement of her leafy covering.

We have attributed the casualty in question to debility in the chick, and this we believe to be the source of all the mischief; but this debility is not always innate, it may be the result of injudicious interference. An experienced poultry maid giving directions to her young successor may be supposed to say as follows:—Do not meddle with the eggs or the nest; the hen knows better than you if, and when, they require turning, and

in what position to place them. She will seldom forsake them, or leave them long enough to be addled, which is caused by the change from heat to cold. Watch patiently and quietly. On the eighteenth or nineteenth day, if you put your ear to the egg, you will hear the chick making a gentle piping noise, and at this time the yolk, which has already begun to be taken up into the body, is now in a state of rapid absorption, being destined to supply the chick with nourishment, even after its exit from the shell. You will very seldom have occasion to assist chickens in emerging from the shell, and the chances are that you will injure them if you attempt it. Act cautiously, but believe that nature does the business best. Some chickens get out in an hour, others in two or three, and it may happen that some may be a day, or a day and a night at work, by starts. For twenty-four hours you should leave them to themselves; if they are not strong enough to break through their shell-work wall, they will not be stout enough to live, and this is the reason why, even with the gentlest assistance, they very seldom *do* live, supposing they have not left the egg by their own efforts. It sometimes happens that the feathers are glued to the lining of the shell, which prevents the bird from clearing itself of it. In this case be very gentle with your fingers, when you draw the feathers from the lining of the shell. You should go to work as if you were removing a blister from your own skin, that is to say, with the greatest tenderness. Be rather tardy than premature; "let patience have her perfect work." Remember that if the chickens leave the shell before they have taken in, or drunk up all the yolk, which must serve them for food during the ensuing twenty-four hours after they see the light, they will pine away, and die in a few days. Beware then of being premature in any efforts, however well intentioned, to extricate a feeble chick; nevertheless, be watchful, and ready for every emergency. So far we may say an experienced poultry-maid would give her directions. But now comes another point to be considered. The chickens are all hatched under favourable circumstances; there is no mishap, one after another extricates itself—what is the treatment to be pursued? Many persons, as the chickens leave the eggs, remove them one by one, and place them in a basket, covered up with flannel, and keep them in a warm place, returning them to the hen when the last has made its appearance. This is not generally necessary; it is unnatural, and may fret the hen, who delights in her young brood, whose piping notes while the chicks were yet in the egg, she has listened to with complacency. The shells however should be cleared from the nest, but unless circumstances render it necessary, the young chickens may be

allowed to remain. But suppose that the weather is piercingly cold, and that the hen is restless, then let the chickens have warmth and every attention. Chickens hatched during the winter months require comfortable housing, the hen being with them, and the less that interference be made between the hen and her chicks, the better; they troop around her; she protects them, gathers them under her wings, and watches over them with the most earnest solicitude.

As we have explained, the chick, before its exit from the egg, has absorbed nourishment intended to last for twenty-four hours. If the chicks look healthy, if their downy plumage soon spreads out, and if they gain their feet pretty soon, even though they should not eat, nothing is to be apprehended. In fact, their abstaining from food only indicates the little need they have for it. However, it is well to have all things in readiness for them; twenty-four hours soon pass away, and their wants ought rather to be anticipated than neglected for an hour. The stages of development in which animals are introduced to the world, are very different in different species—but all is in consonance with this law of variation. The young of some birds, for example, are helpless, and require to be fed by the parents for many days, and the parents are led by the impulse of instinct to feed and watch them: not so the young of gallinaceous birds generally; they emerge from the egg highly developed, and have the use of their limbs and beak. They look, indeed, to the mother for protection, but they pick up their own food, and soon become connoisseurs in the selection of it. As soon as chickens begin to feed they should be *well-fed*. At first crumbs of bread soaked in milk, mixed with boiled rice, and the crumbled yolk of an egg, boiled hard, may be given; a little *under-done* meat chopped very small is relished; and in a day or two grits, oat-cake cut very small, curds, and the like may be given. A shallow pan or vessel of pure clean water should be within their reach; fowls drink freely, and chickens require water—often, indeed, they sip the welcome fluid before they begin to *peck*.

Chickens under the guidance of a hen are apt to wander, not from any wandering disposition of their own, but because they follow their parent or protectress, whose discretion is not by any means equal to her zeal or her courage. They thus become exposed to enemies, as the hawk, the weasel, or the cat; they run the risk of falling into ditches and ponds, or of being saturated with wet—hence something like restriction is imperative. The hen may be placed under a coop with food and water, in a suitable place, as on a grass-plat, and so kept from straying; the young will not forsake her, they will come to her call, and nestle under her wings on the sudden

approach of a shower of rain, or on a change of weather.

The affection displayed by the hen towards her chicks, her anxiety for their safety, and the resolution with which she braves danger in their behalf, need not be insisted on. We have seen a hen at the head of her little troop attack a dog. In due time, however, the hen becomes more and more indifferent to her charge, and when they are strong enough to be independent of her, she abandons them, and generally begins again to lay.

Some persons, especially in France, train capons to act as nurses to their broods of chickens which are reared, and some have recourse to *artificial mothers*, or boxes lined with a soft and warm material for the protection of the brood.

That capons can be taught or trained to hatch a clutch of eggs, and attend to the young, was known to the ancients; and indeed there are cases on record of the cock having laid aside his lordly air, and devoted himself with exemplary patience to the work of incubation; in other cases he has taken the place of the hen in watching over the chickens when accident has deprived them of her care. Aristotle tells us that he witnessed an instance of this kind (*Hist. Anim.*, ix. 49); and Pliny says, "We have heard that when a brood hen chanced to die, the cocks were seen to go about with the chickens, one after another by turns, and to act in every way as would the hen that hatched them, forbearing to crow during the whole period." Ælian and Albertus Magnus allude to similar facts.

Baptista Porta, in his strange work on Natural Magic (*Magia Naturalis*, iv. 26), gives instructions as to the mode of taming and training capons for the task of nursing. In the first place, the bird must be made so familiar as to take food from the hand; this primary step being accomplished, on the evening when his services are required, the feathers must be plucked from off his breast, and the bare skin be irritated by rubbing it with nettles. The chickens must then be put to him; they will naturally huddle under him, and by rubbing with their little downy heads allay the irritation caused by the nettles. This process being repeated for two or three nights, he will gradually conceive an affection for the chickens, and attend to them like a hen. The writer suggests that this attachment may be based on the principle of mutual distress producing mutual sympathy, and that the querulous chirp of the chickens may make the capon, while in pain himself, desirous of allaying their misery. A capon once accustomed to this office will not abandon it, but when one brood is grown up sufficiently, another newly hatched brood may be substituted in their place, and so on in succession, the last chickens being as carefully attended to as were the first.

Some writers are inclined to consider the care bestowed by the capon on young chickens as the result of an instinctive feeling of tenderness which the sight of the helpless brood inspires; and they instance cases in which birds have voluntarily nourished the deserted younglings of other birds. But the cases are not parallel, the capon has to be trained to the novel duties, and does not voluntarily take them upon himself; still less do we think the conduct of the capon to be under the impulse of that affection which urges animals deprived of their young, or even when not deprived, to adapt and nurse the young of other animals, and of which Gilbert White (*Nat. Hist. of Selborne*) relates many curious examples. Probably the forced habit to which the capon is constrained, becomes in time, as it were, second nature, so that instead of the task being at last irksome, it becomes agreeable.

It is not often in England that capons are trained as nurses; but they have been, and are so still occasionally. Willughby says—"We have beheld more than once, not without pleasure and admiration, a capon bringing up a brood of chickens like a hen, clucking to them, feeding them, and brooding them under his wings with as much care and tenderness as their dams are wont to do."—*Ray's Willughby*.

In France, as we have said, the practice is much more common. M. Réaumur assures us, that a lady, a relation of his own, had a vast number of chickens brought up every year with no other nurses than capons. "I have," he says, "frequently seen at her château of Vaujour, near Livry, above two hundred chickens which had only three or four capons for their leaders, it being one of the advantages of this method that a capon may be trusted with two or three times as many chickens as a hen can properly manage. Another advantage is, that a capon may be set to nurse at any time, as he is always ready to undertake the task, and he even seems to become proud of his family in proportion as the number increases; whereas hens will persecute and drive away the chickens which are offered to them after a certain age, and which are, of course, different in size from those which they have themselves hatched. Another advantage consists in saving the hens from the trouble of nursing, as in that case they will either sit again, or begin to lay much sooner, while the chance will be avoided of any disaster happening to the chickens from being abandoned, before they can provide for themselves, by a mother who, as is often the case, recommences laying prematurely, and consequently neglects them."

Be it observed, however, that, upon the acknowledgment of Réaumur, who is an advocate for the plan, the education of capons is not always easily accomplished. Besides the method recom-

mended by Baptista Porta, there are others which are practised; and of these one is to intoxicate the capon with wine or brandy before the chickens are introduced to him, in order to make him fancy them his own—an absurd idea, and a useless and cruel expedient. Réaumur, however, tried it, and found that the capon, instead of receiving the chickens with kindness, crushed some beneath his feet to death, and attacked others with his beak, driving them away. What else could be expected? The poultry-maid at the Château de Vaujour instituted another process, requiring some trouble and patience, but founded on rational principles. Her plan was to put each capon into a box of considerable depth, rather narrow, and darkened by a covering of boards. In this manner she kept them secluded, but took them out two or three times a-day to feed. As soon as she judged them weary of solitude, she placed with each capon two or three chickens tolerably well advanced in growth, and fed them together. If the capon showed a disposition to ill-treat his young companions, they were removed, and after two or three further days of solitude, others were again put to him. By following out this plan, varied in minor details according to circumstances, the capon first contracts a habit of living on friendly terms with a few chickens—he then notices them—more are added—he receives them kindly, and may now be allowed his liberty, when he will march at the head of his adopted brood. He will cluck to them, gather them under his wings, scratch the ground for them, and, on discovering any delicacy, call them around him. What is very remarkable is, that once having been well-trained, and habituated to two or three broods in succession, he will take to his task in the spring, after being unemployed during the winter months, without hesitation. The habit is established, and will continue through life.

With respect to *artificial* mothers, they are undoubtedly useful when there is no natural parent or trained capon to protect and warm the chickens; and many persons are great advocates for them. These *artificial* mothers are nothing more than wooden trays or boxes, so contrived as to impart the necessary heat to the young chickens, after exclusion from the egg, till they are sufficiently strong and grown to need no further assistance. When chickens are hatched by artificial means, as by the *eccaleobion*, or in an oven, these protectors are essential; for, without some substitute for the parent, the chicks would perish.

The chief benefit resulting from the use of *artificial* mothers is, that several broods may be reared at once, and with no more trouble than one. According to Mr. Young, five broods may be reared at the same time under an artificial mother, constructed in the following manner:—

“This mother should be framed of a board ten inches broad and fifteen inches long, resting on two legs in front four inches in height, and on two props behind two inches in height. The board must be perforated with many small gimlet holes for the escape of the heated air, and lined with lamb-skin dressed with the wool on; the woolly side is to come in contact with the chickens. Over three of these mothers a wicker basket is to be placed for the protection of the chickens, four feet long, two feet broad, and fourteen inches high, with a lid open, a wooden sliding bottom to draw out for cleaning, and a long narrow trough along the front, resting on two very low stools, for holding their food. Perches are to be fixed in the basket for the more advanced to roost on. A flannel curtain is to be placed in front and at both ends of the mothers, for the chickens to run under, which they soon learn to push outwards and inwards. These mothers, with the wicker baskets over them, are to be placed against a hot wall at the back of the kitchen fire, or in any other warm situation, where the heat shall not exceed eighty degrees of Fahrenheit.

“When the chickens are a week old, they are to be carried with a mother to a grass-plot for feeding, and to be kept warm by a tin tube filled with some hot water, which will continue sufficiently warm for about three hours, when the hot water is to be renewed. Towards evening the mothers are to be again placed against the hot wall.”

Réaumur, who paid much attention to this subject, planned many kinds of apparatus and improved upon them, according to the dictates of experience. His original apparatus, he observes, did not seem sufficiently perfect; “for though the chickens were kept in warm air, they had no equivalent for the gentle pressure of the belly of the mother upon their backs when she sits over them. Their back is, in fact, necessarily more warmed than the other parts of the body while huddling under their mother's wings; whereas their belly often rests on the cold moist earth, the reverse of what took place in the apparatus, where their feet were the best warmed. The chickens themselves indicated that they were more in want of having their backs warmed than any other part of their body; for, after all of them had repaired to the warmest end of the apparatus, they remained motionless, standing bolt upright upon their legs, with their backs turned towards the sides or end of the apartment, in order to procure the necessary warmth. I therefore judged that they wanted an apparatus that might, by resting on them, determine them to take the same attitude as they naturally assume under the hen; and I contrived an inanimate mother to supply in this respect the want of a living one.”

The artificial mother contrived upon these

principles consists of a box lined with sheep-skin with the wool on it, the bottom being of a square form, and the upper sloping like the lid of a writing-desk. This box is placed at the end of a crib or cage, shut with a grating of willow net or wire, and closed above with a hinged lid, the whole being so formed that the chickens can walk round the sides. The slope of the cover permits the chickens to arrange themselves according to their sizes; but as it is their practice, as well as that of all other young birds, to press very closely together, and even to climb upon one another, the small and the weak being thereby in danger of being crushed or smothered, Réaumur constructed his artificial mother open at both ends, or at most with only a loose netting hanging over it. Through this the weakest chicken can escape when it feels itself too much squeezed, and then, by going round to the other opening, it may find a less dangerous neighbourhood. The ingenious author even made improvements upon this contrivance, one of which consisted in keeping the cover sloped so low as to prevent the chickens from climbing on each other, and raising it as they increased in growth. Another was the dividing the large cribs into two by means of a transverse partition, so as to separate the chickens of different sizes.

Of the utility of this apparatus Réaumur speaks in strong terms, preferring it to the natural parent, but in this we think he goes too far; certainly he was very successful, and not only contrived several *artificial* mothers of great ingenuity, but even succeeded in hatching eggs by the heat of stoves, one of which was combined with the rearing apparatus, the whole being remarkable for elegance and simplicity. *Artificial* mothers may be easily contrived for young ducks and geese, by having attached to them a little play ground of green turf with a miniature pond in the centre, to which they will naturally resort.

In the contrivance and management of *artificial* mothers, reflection, experience, and ingenuity are requisite; directions and descriptions serve but as hints; the principle is to afford a warmth and shelter to the young brood equivalent to what the parent supplies, while at the same time care is to be taken that the chickens be not suffocated, excess of heat and want of ventilation being evils to be as much avoided, on the one hand, as insufficiency of warmth is on the other.

The *artificial* mother is only a sort of house for chickens newly hatched, and generally speaking for chickens hatched under hens; but were chickens hatched in great numbers by some simple apparatus, the *artificial* mother would become an essential; for the ultimate success of the operation, at least in our climate and the adjacent portion of Europe, would depend upon a substitute for the natural parent.

The process of bringing the vitalized embryo of the egg through all its stages of development until the chick makes its exit from the shell, by the judicious administration and management of *artificial* heat, has been long practised in Egypt, nor have experiments both in our own country and France been unsuccessful, but whether the plan will ever become general, so that a supply of apparatus-hatched chickens may be in constant readiness to meet the public demand, is very questionable. Our humid changeable climate is not favourable for the process on a large scale; the least change of temperature is fatal, for it is indispensable that an equable temperature of about 96 degrees (106, as Mr. Cantelo states) of Fahrenheit be maintained. At a lower temperature the development of the embryo cannot be perfected. Hence although in Egypt, which enjoys a favourable atmospheric state for the accomplishment of the experiment, the operation is well accomplished, success in our uncertain climate is far from certain, and we doubt whether the mode practised in Egypt would at all answer in England. In fact it is wonderful that in Egypt the plan there adopted should produce the results described; it must involve great practical experience. At what epoch the art of hatching chickens in Egypt began to be practised, we cannot learn, probably for many centuries, for it is alluded to both by Aristotle and Diodorus, although they give erroneous details.

It would appear that the art is chiefly understood and practised by certain people living in the village of Berme and a few adjoining places in the Delta, who leave it as an heirloom to their children, forbidding them to impart it to strangers, consequently the information which has been collected respecting it is superficial. Be this as it may, the art is carried on by these people exclusively, generation after generation, who are all licensed, so that their number is known, and cannot be increased without the approbation or licence of the Aga; each Bermean pays about ten crowns for his certificate, which entitles him to seek for practice.

At the beginning of autumn, which is said to be the most favourable for the process, these Bermeans disperse themselves over the country, each taking the management of a number of eggs entrusted to him by those who are themselves unacquainted with the art. His first care is to have suitable ovens erected, after which he fits them for the reception of the eggs, by regulating their temperature. In all this there is no mystery, no attempt at concealment. The great secret is the manner of so managing the fire as to produce a temperature so nicely adjusted and maintained as to effect the evolution of the chickens.

The number of ovens dispersed through the

different districts of Egypt has been estimated at 386. They are called *mamals*, and each is managed by a licensed Bermean. In each of these *mamals* six or eight broods are annually hatched, each brood or rather batch consisting of from forty to eighty thousand. The Bermean guarantees two-thirds of the eggs entrusted to him by the undertaker, and if any overplus eggs are hatched, the chickens are the perquisite of the Bermean, which he adds to thirty or forty crowns for about six months' services, which he receives, exclusive of his board.

An Egyptian hatching oven, or *mamal*, is thus described:—"It is a brick structure of about nine feet in height. The middle is formed into a passage or gallery about three feet wide, and eight feet high, which runs from one end of the building to the other, forming the channel of communication with the chambers or true ovens, thus facilitating the various operations requisite for the treatment of the eggs. This gallery has a round hole by way of entrance, through which the Bermean passes, and which is stopped up when necessary. On each side of this gallery there is a double row of chambers, an upper and under row—that is, every chamber on the ground floor has one over it, of precisely the same dimensions, namely three feet in height, four or five in breadth, and twelve or fifteen in length. These have a round hole for an entrance from the gallery, about a foot and a half in diameter, wide enough for a man to creep through, and into each are put four or five thousand eggs. The number of rooms or chambers in one *mamal* varies, and the upper rooms communicate with the lower by means of a circular hole in the centre of the ceiling of the under room, which constitutes of course the floor of the upper room. The eggs are laid upon the floor, but not on the bare bricks, a bed of flax or a mat, or some other non-conducting material, is carefully spread to receive them.

"In each of the upper rooms is a fire-place for warming the lower room, the heat being communicated through the circular hole in the centre of the floor. The fire-place is a sort of gutter two inches deep and six wide, which runs sometimes all round the floor, but is mostly continued along two of its sides only. As wood or charcoal would make too quick a fire, they use the dung of cows or camels mixed with straw, and formed into cakes, and dried. The doors or holes which open into the gallery serve for chimneys to let out the smoke, which finally escapes through openings in the arch of the gallery itself. The fire in the gutters is only kept up, according to some, for an hour in the morning and an hour at night, which they call the dinner and supper of the chickens; while others say it is lighted four times a-day. The difference probably depends on the tempera-

ture of the weather. When the smoke of the fires has subsided, the openings into the gallery from the several rooms are carefully stuffed with bundles of coarse tow, by which the heat is more effectually confined than it could be by a wooden door.

"When the fires have been continued for a certain number of days, eight, ten, or twelve, according to the weather, they are discontinued, the heat acquired by the ovens being then sufficient to finish the hatching, which requires in all twenty-one days, the same time as when eggs are naturally hatched by the hen. About the middle of this period a number of eggs in the lower are moved into the upper rooms, in order to give the chicks greater facility in making their exit from the shell than they would have if a number of eggs were piled up above them."

Thus do sixty or seventy thousand chickens emerge from their imprisonment, swarming in their *mamal* like bees in a hive, and thus does the Bermean, guided by his own feelings and experience, exercise an art with a degree of success which seems marvellous. We should take into account, however, that in the Delta of Egypt the autumnal season is one of warmth, with a steady temperature. Would the Bermean method succeed in England? We think not.

Aristotle and Diodorus describe the process of hatching eggs under layers of dung, as in manure beds; and Réaumur, trusting to their statement, which he soon found to be the result either of theory or of some erroneous information, commenced a series of experiments, hoping to rival the Bermean in his art; he found, however, after many trials, that though by the heat thus produced vitality commenced, and the development of the chick was carried to a certain point, the young ultimately perished; in fact, the vapour exhaled from the fermenting manure pervaded the pores of the shell, and sooner or later became fatal to the embryo. In some cases the chicks were well-formed and even feathered, but long before their time for leaving the shell they perished. He found, moreover, a difficulty in regulating the temperature; in his first trials, for example, he nearly cooked the eggs by excess of heat; and though he afterwards contrived to ensure a due temperature, yet the exhalation of the manure defeated his projects. After many failures he at last accomplished his purpose, and made a sort of wooden oven which was impermeable to the vapour. He thus details his experiment:—"I caused one of those casks called half-hogsheads to be sunk into the bed of dung, after having had a hole dug large enough for its admission, and taking great care to have the edges raised three or four inches above the surface of the hot-bed. The top had been previously converted into a moveable lid by means of cross-bars, and one large and eight smaller holes

were made in it, and bunged with corks to serve as regulators of the temperature within. The eggs were let down into the cask in round baskets, about two inches in diameter less than the cask, some being deep, others shallow, the former containing two and the latter one layer of eggs. I caused three of these baskets to be placed in the oven in such a manner that the lowest was some inches distant from the bottom, and the highest a few inches lower than the upper edge. When the time had elapsed in which my previous experiments had failed, not one egg of this new oven was tainted, and at the end of twenty days, the gardener, who had taken care of so many unsuccessful batches, came in the evening to tell me, with the greatest possible emotion, what he knew must be very pleasing news, namely that one of my eggs was chipped, and the chick could be heard within endeavouring to chirp. This chicken did not disappoint our hopes, having been hatched next day, and it was even preceded by some others, and followed by a great many more. From that time indeed I began to see some hatched every day." The eggs had sustained no injury from the noxious vapour, the heat had been duly regulated, and the result was fortunate. M. Réaumur did not stop here, he was applied to by the rector of St. Sulpice, who desired to introduce the plan into some of the charitable institutions. Instantly M. Réaumur conceived the idea that advantage might be taken of the heat produced in baking houses, and accordingly he found that the temperature of a room situated over the bread-ovens of the institution called L'Enfant Jésus, could be managed so as to answer the purpose in view. The eggs were placed on the shelves of a small cupboard, and entrusted to the care of one of the nuns, who was enthusiastic in her employment. The experiments were in the main tolerably successful, but we can by no means coincide with those who would thence infer that bakers, pastry-cooks, and others might apply their ovens to a similar use, by constructing hatching chambers in connexion with them. The expense, the trouble, the uncertainty, to say nothing of interruption to other business, and the skill and practice, necessarily the result of many mishaps, render the carrying on of such plans utterly out of all question, however feasible they appear on paper. For ourselves we confess that we look upon *artificial* incubation and *artificial* mothers as among things which may amuse experimentalists, afford gratification to a few ingenious schemers, excite curiosity, but end in nothing. It is of no use to point to Egypt as if *no* fowls reared their own broods there. The climate, moreover, of Egypt and of Western Europe are different, and the same observation applies to China, where ducks are reared by artificial means, though we know not precisely

how. Let us be content with our poultry-yards and their feathered inmates as they are, and be grateful to Providence for the fowls of the air, which are peculiarly the pensioners upon our bounty. If any apparatus promised wonders in the poultry line, it was the *eccaleobion* (literally the invoker of life), but what is now heard of its performances, and where are the thousands of chickens with which our tables, from the poorest up to the highest, were to be supplied! It may be said, who, fifty years since, would have dreamed of locomotive steam-engines propelling chariots along railroads, and urging mighty vessels through the deep? The case is different—there is no analogy between the laws of mechanics and the laws of vitality; and improve upon steam-engines as we may, we shall not therefore improve in the art of bringing chickens from eggs, so as to render hens useless except as the parents of them.

We admit that the *eccaleobion* was an ingenious contrivance for hatching chickens by means of heated air. It presented the appearance of an oblong box nine feet in length, three feet in breadth, and three feet in height. It had no connexion with the walls against which it was placed, or the table on which it stood; its regulating power was within. According to Mr. Bucknell, the inventor and proprietor of this machine, which some years ago excited great attention, the *eccaleobion* possessed a perfect and absolute command over temperature from 300 degrees of Fahrenheit to that of cold water, so that any substance submitted to its influence is uniformly acted upon over its whole surface at any required intermediate degree within the above range, and such heat is maintained unaltered without trouble or difficulty for any length of time. Hence, by means of this absolute and complete command over the temperature obtained by this machine, the impregnated egg of any bird, not stale, placed within its influence at the proper degree of warmth, is at the expiration of its natural time elicited into life without the possibility of a failure, which is sometimes the case with eggs subjected to the caprice of their natural parent. During the public exhibition of this instrument thirty or forty thousand chickens, perhaps more, were stated to have been brought into existence by a single machine, which was constructed to contain two thousand eggs at a given time. These chickens, with proper attention and under suitable treatment, were said to grow as healthy and strong as those under a parent's care. Of course artificial mothers, warmth, a dry soil, and proper buildings would be needed. What might not be expected from a multiplication of these machines, or their formation on a larger scale! Incalculable, surely, must be the number of fowls given to the country; and as is the increase of laying hens so will be that of their eggs, seeing

that each hen in a domestic state will lay on an average at least one hundred eggs per annum. The prospect is not only nationally important, but opens a field for enterprise. In such a light did Mr. Bucknell look upon the affair, and thus influenced he writes as follows:—"We call the Egyptians barbarous; the procuring, however, by art and industry an abundant supply of that necessary of life, good animal food, is no evidence of barbarism. If the population of the United Kingdom, which as respects Egypt, is as twenty-four to two, were as well supplied with this artificial production as Egypt, it would require not ninety-two millions, but one thousand one hundred and four millions of poultry annually for them to be as well fed in this respect as the uncivilized natives of Egypt. But how stands the account in this matter? Full one-third of our population subsist almost entirely, or rather starve, upon potatoes alone [would that they had potatoes in abundance]; another third have, in addition to this edible, oaten or inferior wheaten bread, with one or two meals of fat pork or the refuse of the shambles per week [the Roman population of the olden time never fared half so well]; while a considerable majority of the remaining third seldom are able to procure an ample daily supply of good butcher's meat, or obtain the luxury of poultry from year to year [this, as far as England, Scotland, and Wales are concerned, we cannot admit]. On the continent of Europe the population is in a still worse condition; fish, soups made from herbs, a stuff called bread, made from every variety of grain, black, brown, hard, and sour, such as no Englishman could eat, olives, chestnuts [why not add acorns—the Spanish edible acorn], the pulpy saccharine fruits, roots, stalks and leaves, and not unfrequently the bark of trees, saw-dust, blubber, train-oil [oh, Esquimaux, wait for the eccaleobion!], with frogs and snails [Ancient Roman epicures, why did you keep snaileries? French gourmands, why do you relish *pâté de grenouilles*?], these make up and constitute a good part of the food of the greater portion of the inhabitants of Europe. There is no other cause for this than the excessive ignorance of the population."—*Treatise on Artificial Incubation, by W. Bucknell, Esq.*

The writer means well, he was enthusiastic in his subject; fowls were ever before his imagination, and the eccaleobion was to spread its blessings from Southern Europe even to the borders of the Arctic sea; the rein-deer, and the whales, and the porpoises, and the seals, were to lead happy lives; the Laplander, the Samoiede, and the dweller on the banks of the Lena, were to astonish their tribes by unknown birds, better than all their wild-ducks, hatched by means apparently miraculous. Blubber was to be scouted, roast chickens were to be in the ascendant! Then, to come into

the southern regions of the vine and the olive, the great snail, or *helix pomatia*, was to crawl about uncared for, and the edible frog, *rana esculenta*, was to croak and fatten unmolested in every ditch throughout sunny France. As for the labourers of our island, after a hard day's ploughing or reaping, a good lump of fat bacon or pork and a dish of steaming potatoes was to be replaced by a pair of delicate chickens, nicely boiled and served with parsley and butter. All this was to be effected by the magic eccaleobion!

But to be serious—What has the eccaleobion done? Some years have passed since the great things it promised were to be effected, and since it was "a wonder and a show." This we know, that fowls are dear and not over plentiful; two chickens, which any hearty man might have eaten, appeared this last day of July, 1848, on our frugal board, and on inquiry we were informed that their price was 5s. 6d. We thought of the eccaleobion, the 5s. 6d., and the promises made by the former.

We have recently visited Mr. Cantelo's institution, or, as he terms it, "model poultry farm," at Chiswick, close to the main road opposite Chiswick Lane. In this institution numbers of chickens, Guinea fowl, and ducks are raised by artificial heat most ingeniously applied by "top contact," so as to produce the same effect on the vitalized germ as the heat of the incubating hen. This heat has been proved by Mr. Cantelo to be as high as 106 degrees of Fahrenheit. The eggs are in fact hatched under artificial incubators, which allow the inferior portion of the egg to remain cool until warmed by the inward circulation of the blood, as occurs in natural incubation, but not when eggs are placed in ovens or heated apartments. "The difference," says Mr. Cantelo, "between top contact heat and that received from radiation as applied to hatching is this: by radiation or oven heat the eggs will be hours in arriving at the desired temperature, not only when first put to hatch, but at any time afterwards when they may have been allowed to get cool. The eggs of course will heat alike over their whole surface, and consequently evaporate equally from every part. On the contrary, heat applied in top contact penetrates almost instantly and revivifies the germ, and although a much higher temperature is used in this case in imitation of nature, that is 106 instead of 98 degrees, still, inasmuch as but a small surface is heated, the loss of moisture is much less than by a radiating heat. The fowl leaves her nest every day in search of food for twenty or thirty minutes; this must be imitated also, as the temporary loss of heat has the effect of causing the contents of the egg to diminish in bulk, and the vacuum is formed by a fresh supply (of air) drawn in for the nourishment of the germ. The eggs

must be moved three times a-day, morning, noon, and night, which prevents the adhesion of any part of the fluid to the shell, and gives the small blood-vessels better opportunity to spread around the surface of the egg. This is effected by nature; when the fowl leaves her nest or returns to it, she naturally disturbs the eggs, and also from any change she may make in her position while upon her nest."

Mr. Cantelo thus describes the *hydro-incubator*. The form or method considered by the inventor as best calculated for the application of top contact heat to eggs during incubation is that of a current of warm water flowing over an impermeable or waterproof cloth, beneath which the eggs are placed. This is effected on a large scale by pumps, and in a small apparatus by the law of gravitation causing the warm particles to rise, and those that have become partially cooled to fall. A tank of water is kept continually at a temperature of 109 degrees, from the surface of which it will naturally flow over the waterproof cloth, a return pipe being so placed as to connect the outer end of the cloth with the bottom of the tank. The eggs are placed in drawers having open work or perforated bottoms, and they are laid on a piece of thin woollen cloth. The drawers are placed beneath the *incubator*, and raised so that the eggs come in contact with the waterproof cloth, but so as to allow a space between the sides of the drawers and the incubating cloth. These sides being lower than the top of the eggs, space is afforded for the air to circulate around them, as it rises through the bottom and passes out over the edges of the drawers.

All this cannot be well understood without an inspection of Mr. Cantelo's ingenious apparatus; to attempt to describe the artificial hydro-mother, and the various details connected with the plans adopted for rearing the chickens when hatched (of which we saw hundreds running about in their compartments, and nestling under their artificial mothers), would be futile. The whole plan cannot be properly conveyed to the reader by words, yet it is at once simple and efficient. The water is heated by slowly burning charcoal fires, in an apparatus most admirably contrived, and in the house there are fattening pens of the most approved construction.

Mr. Cantelo informs us that his system is in operation at La Varenne de St. Maur, near Paris.

But now returns the old question—Will it eventually answer, come into general operation, and render poultry plentiful and cheap? We answer, No. Take the following estimate of the cost, expenses of working, and profits of a five-tray patent hydro-incubator, for one (we acknowledge the *first*) year—to produce, as asserted, twenty fowls a-day for market.

	£	s.	d.
Cost of incubator	105	0	0
2 chicken-mothers, at £15 15s. each	31	10	0
9000 eggs for 18 broods in the year, at 1d. each	37	10	0
75 chickens from every 100 eggs gives 6750 chickens a-year, and the cost of their food up to 96 days old will be 8d. each (much more)	225	0	0
Charcoal for the year	13	0	0
Expense of servants and clerks, say	152	0	0
Rent of land (2 acres), say	6	0	0
Expense of building, offices, stores, houses, laying houses, roosting houses, coops, fattening houses, &c., &c., say	280	0	0
	£850	0	0
Gain by 6750 chickens, at 2s. each?	675	0	0
Gain by guano of fowls as manure, estimated at 50 tons, collected at 60s., per ton, say?	150	0	0
Gain by feathers, say?	100	0	0
	£925	0	0

We acknowledge this calculation to be very different from those given by Mr. Cantelo; he reckons nothing (nor have we) for the cost of two or three hundred laying hens; great losses by mortality are not taken into the account; food is reckoned too low; the expenses of a horse, cart, and carter have to be put in, and those also of the carriage of eggs bought in the country, together with the cost of fattening, for ten days, each cooped fowl, necessary repairs, losses, &c., &c.; besides, we reckon wages too low, as also the cost of building and the rent of land (at least near London). What market, again, is there for fowls' guano and fowls' feathers? We would ask, does Mr. Cantelo find his experimental fowl-farm pay? His figures show that it ought to return a fortune. But no; these are all ingenious experiments, and as such are worth notice and deserving praise, but as for being of general practical utility in any sense, few we believe will entertain the opinion. Mr. Cantelo puts into the credit side of his balance sheet, the value of the incubator and chicken mothers; who will buy them on the breaking-up of any establishment? They are not available stock in trade; a good piano may fetch something at a public auction, but who will bid for a hydro-incubator! We will say no more; in our humble opinion all these ingenious imitations of, and interferences with, nature, though they may flourish for a day (and *flourish* they cannot be said to do), will pass away as things that have never been. Yet Mr. Cantelo's "fowl-farm" is well worth a naturalist's visit.

There is something like an analogy, or parallelism, between the vine and the fowl—abundant in the warmer climates, where it is *really common* food, it becomes scarcer and scarcer as we advance to colder and more humid regions, with long winters and short summers; and though in our island and the adjacent parts of Europe, grain growing countries, it is in plenty and perfection, yet a short journey will take us to where it is scarce,

and a little advance to where it is a rarity. No eccaleobion can make any alteration in this respect.

But we must leave this part of our subject, for observations on other points.

Feeding.—It is a bad practice to underfeed poultry—we should say that from the very first they should have good and solid food; the store hens, for profit sake, should be got into laying condition as early as possible, and those intended for killing or selling off for the market should be kept up in good condition, really ready for the spit, and therefore rapid fatteners, for those who like, as some do, a grease-laden fowl. We do not recommend that the choicest corn should be appropriated to the feathered bipeds of the farm, but we advocate good wholesome grain, which is not little less than mere refuse. How can poultry thrive on a poor diet; wheat, barley, buck-wheat, rye, oats, and oat-meal made into oat-cakes, will form the staple food,* potatoes steamed, mashed with oat-

* We wonder that the sunflower (*Helianthus annuus*) is not grown in our country, for the sake of its seeds as valuable food for poultry, as well as for pigs, oxen, and other domestic animals. For this purpose, the seeds should be reduced to the state of meal, and this meal should be made into balls or cakes; indeed after expressing the oil, which is valuable, the residue will form a cake of nutritious food.

The seeds may also be given whole. Finches are very fond of them, so are fowls. Few persons, generally speaking, are aware of the value of the sun-flower, and could we persuade farmers and others to sow this plant, with a view to the feeding of their live stock, we should think that we had done some service. A small patch of ground in any corner, or a border along the hedge of a field, might be appropriated to its culture without infringement upon corn land. The reader will not be displeased with the following extract from the *Penny Cyclopædia*:—

"*H. annuus*, annual sunflower, is an herbaceous annual plant with thick rough stems from six to twenty feet in height; leaves alternate, petiolate, nearly heart-shaped, crenulated or dented, rough; the heads are large, from one to two feet in diameter, and composed of a multitude of flowers of a beautiful yellow colour, terminal, solitary, inclined, the disc vertical and oftenest facing the south. This species is the largest of the genus: it is indigenous in Mexico and Peru; it was early introduced into Europe after the discovery of America, and has since been very generally cultivated in gardens, on account of its very large and handsome yellow flowers. The plant, however, in Europe never attains the height nor the flowers the size they do in their native soil and climate. The albumen of the seeds of this plant contains a large quantity of oil; and it has been proposed to cultivate it for the sake of obtaining this oil, which is very palatable, and might be used for the table. For this purpose the Society of Arts, some years ago, offered a prize for the raising a quantity of the seed; some experiments were made, but they do not appear to have been followed up in this country. In France it has been cultivated in fields to some extent, and from the variety of uses to which the plant may be applied, it would seem to deserve further attention. The quantity of oil to be obtained from the seeds varies; they do not produce so much in this country as in the south of France, nor so much there as in Spain and America. M. Henry found that twenty-five pounds of the achenia, when deprived of their pericarps, gave eight pounds of albumen, which yielded by expression, cold, thirteen ounces of a citron-coloured oil, and the same quantity hot yielded nineteen ounces of oil slightly acid. In Spain the seeds are said to produce half their weight of oil. (Pouchet, *Traité de Botanique*, tom. ii., p. 193.) The fruit of this plant has been strongly recommended for feeding various kinds of domestic animals. Cows and oxen, horses, sheep, pigs, rabbits, and poultry are all fond of it. For this purpose the fruit should be reduced to the state of meal, and can either be given dry or made into a cake. The cake also that is left after expressing the oil, may be used for feeding animals. Small cage-birds, as canaries, finches, &c., are very fond of the seeds. When

meal and given warm, constitute a nutritious food; some recommend that the grain, especially the barley, wheat, and rye, be boiled before it is given to the fowls—it swells greatly by this process, and therefore a less quantity in reality fills the crop of the birds; hence it is a saving plan, and much practised in France—but of course the fowls derive less nutriment from it than from the same measure of solid grain unboiled. For example, four pints of barley when boiled will fill ten pint measures, four pints of buck-wheat will fill fourteen pint measures, four of wheat ten, and four of rye fifteen. Now suppose each grown fowl has a daily allowance of a quarter of a pint of grain, exclusive of whatever vegetables, seeds, and insects it may pick up, it follows that the boiled quarter of a pint of wheat will be equivalent to less than one-eighth of a pint of unboiled grain, so that, in fact, the fowl will be cheated as to the quantum of nutriment, though not in the measure of it. It is useless to argue that boiled grain is more nutritious than grain *au naturel*. The human stomach may require it to be boiled, but the digestive apparatus of the fowl is provided with a grinding mill for the express purpose of turning the grain into flour, and hence nature points out what that food should be.

With regard to feeding fowls for the table, much depends on circumstances. Spring chickens, especially when fine, sell at a high price—these may be put up for feeding as soon as the hen ceases to regard them, and before they lose their first good condition. In their fattening pens they will have no opportunity of picking up little pebbles, their mills therefore will be inoperative, and the diet must consequently be pultaceous, viz. bread and milk, barley-meal, or oatmeal and milk, the meal of steamed potatoes mixed with barley-meal, with the occasional addition of a few grains of cayenne pepper, as some recommend, or of dried nettle seeds, which the foreign feeders are in the habit of giving. Where chickens have the run of a good farm-yard, and plenty of food, it is a work of supererogation to pen them for fattening; they will be ready at any time for the table, and their flesh being in its healthy state, will be sweet and juicy, delicately tender, and sufficiently fat. Some indeed prefer fattened fowls, but this is a

torrified, in the same manner as the seeds of coffee, they make an agreeable drink, which may be used as a substitute for that article. The liber of the bark of the stem is composed of a very tough woody tissue, which may be manufactured into twine and cordage, and a very good paper may also be made from the same tissue. The pith of this plant is almost entirely composed of the vegetable principle called *medullin*, and has been used in Russia for the manufacture of moxas for medical purposes. All parts of the plant contain a considerable quantity of nitre, and on this account when dried they form an excellent material for fuel. In the garden it is a handsome ornament, opening its large heads of flowers in July and August, which are then a favourite resort of bees."

matter of taste—to us the greasy fat of poultry is very disgusting. Mr. Mowbray found that pullets hatched in March, and constantly fed upon high diet, not only laid eggs abundantly in the autumn, but were, when killed in the month of February or March following, as fat as any one could have desired them to be, opening, as he says, more like Michaelmas geese than chickens. However, all poultry are not kept upon high diet, hence their fattening is in many instances necessary. For tolerably grown fowls, about three weeks' confinement and feeding will suffice. Many poulterers give grease mixed with farinaceous food very largely, a diet upon which the fowls fatten rapidly, and indeed often become loaded with fat, which makes them look well to the eye; but their flesh, if not disagreeable, is insipid, and altogether inferior to that of a fowl fed well and running at large about a plenty-stocked barn-yard previously to its execution.

The practice of cramming poultry in order to load their bodies with fat in as short a time as possible, is very common. The poor bird's digestive powers are thus taxed to the utmost—whether at the expense of health or not, let any one determine. However this may be, it is a common course of treatment, and the poultry-feeders about Horsham in Sussex, and in Surrey, Essex, and Berkshire, will, it is said, fatten each perhaps two hundred fowls, ready for the market, in little more than a fortnight, each fowl weighing from five to seven, or even eight, lbs. In France the same practice prevails; but there the poultry, instead of being fed by the hand exclusively, have their crops gorged by means of a machine, which will enable one man to cram as many as fifty birds in half an hour. It is an instrument on the principle of the stomach pump. The mouths of the birds are held open by the operator, and the crop is filled from a reservoir of pulaceous food, through a tube introduced into the pharynx. In the mean time, the prisoners are either closely confined (the cribs being contrived for cleanliness) in a dark place, or they have their eyes put out, as the most effectual mode of keeping them in darkness. Some of the poulterers give the fowls a little henbane seed from time to time to induce a state of somnolency. In addition to all this, perhaps in order to render them cool under this treatment, and prevent that feverishness which must be expected from such unnatural overfeeding, they pluck the feathers from their heads, bellies, and wings, thus half denuding the wretched sufferers. Fowls thus treated attain to the desired state of perfection in about fifteen days, after this they decline, and if not killed would perish.

In England the practice of making *capons* (that is, of emasculating the males), and also

poulardes (that is, of rendering the hens unfertile), is not very extensive, though it is carried on in some counties. Cobbett was of opinion that no fowls, excepting fattened capons or *poulardes*, were good for anything; the French appear to be much of his way of thinking in this respect, for in France the practice is very common. The motive is to produce a tendency to the acquisition of fat. The operation requires considerable skill and expertness of manipulation, and is said to be but seldom fatal. The birds (summer being the usual time in which it is performed) are confined when all is over in a place of cool temperature, and fed for a few days on good food. If no gangrené supervene, the incision, which was stitched up, soon heals, and the birds become ready for the process of fattening. Of the plan of training capons to the duty of tending chickens we have already spoken. It has been asserted that males in their altered condition lose nothing of the natural energy, pride, and spirit, for which the cock is so much distinguished, and that he still domineers over his companions; but this is far from being correct: the capon is spiritless, his combs and gills are pallid, he ceases his crow of defiance, and is shunned or neglected by the troop of hens who would once have thronged around him. Young cocks, and pullets of the largest size, and of a plump round form, are usually selected by preference for this transformation.* A full-sized fat capon will weigh from seven to ten pounds.

As fowls are to be killed for the table, it may be as well to point out a merciful way of destroying them, a point on which few concern themselves. Fowls are never bled to death (like turkeys and geese), as, from the loss of blood, the flesh becomes dry and insipid. Poulterers and higglers either strain at the vertebræ of the neck till their dislocation takes place, or produce the same effect by a sudden twist. The former mode is very cruel, as it keeps the bird long in agony; we ourselves have witnessed the execution with no pleasant feelings, and wish it to be discontinued: the second plan is more merciful, but is not always skilfully managed, and requires considerable dexterity. The best plan is to take a blunt stick such as a child's bat or boy's wooden sword, and strike the bird a smart blow at the back of the neck, about the third joint from the head; death follows in a moment.

DISEASES.

Fowls are subject to various diseases, as *apoplexy*, *diarrhæa*, *rheumatism*, the *pip* or *thrush*, the *croup* (often termed *roup*), the *gapes*, *inflammation of the tail gland* (also called the *roup*, though the

* Mr. Young, in his *Report on the County of Sussex*, observes that much art and attention are requisite to make capons, and that the Sussex breed are too long in the body for success in the operation, by which many are lost.

term be improperly applied), and other diseases which are not understood. Now, let us at once confess our ignorance relative to the treatment of fowls under their many maladies. Their ailments have hitherto failed, with perhaps one exception, to attract scientific observation, and no wonder. Who attends to them? what complaint do they make? and when they die, who, acquainted with the symptoms before death, makes a post-mortem examination, and then refers those symptoms to the morbid appearances which his scalpel has revealed? We ourselves have examined after death hundreds of birds of all tribes and species, and have been able only to detect as the cause of their dissolution the following *active* disorders:—*apoplexy*, evidenced by inflammation of the membranes of the brain, or by effusion of blood within or upon it; *peritoneal inflammation*, rapidly fatal; *inflammation of the lungs*, including the bronchial tubes; *tracheal inflammation* (or gapes), with parasitic worms in the wind-pipe (see observations on the calf); *inflammation of the mucous membrane of the intestines*, evidenced by previous dysentery; and *inflammation or intumescence of the rump gland*, symptomatic of a *febrile condition*. These are the post-mortem data which in most cases have been presented to us; sometimes heart affections have come under our notice—indeed but lately we dissected a parrot which suddenly died, though in apparent good health, from a rupture of the right auricle of the heart. But what shall we say as to the treatment of fowls under disease? very little. To speak the truth, neither are their diseases well understood, nor is the treatment of them anything but empirical. (This observation applies to all our domestic poultry.) Yet a few observations seem to be required. As to

APOPLEXY,

we can only say that it makes its attack in most instances without the slightest previous warning; could it be known that a bird was in danger of this exigency, means might perhaps be taken to insure safety. We have known hundreds of aviary birds, in the finest health apparently, drop dead from their perch, and, as our dissections have assured us, from this cause. They were overfed, they had not to exercise themselves in the task of seeking for food, they had an allowance in unlimited measure, but had no according measure of muscular exertion; they “did not earn their bread before they ate it,” as wild birds do. “*Experientia docet.*” We have no other advice to give as to the means of *prevention*.

With respect to the

PIP OR THRUSH,

we regard it as a token of derangement of the mucous membrane of the alimentary canal gene-

rally, and not as a local disease; it is *symptomatic*. Its cure will be effected by low diet, that is (in the case of fowls) by an allowance of fresh vegetable food mixed with potatoes and a little oatmeal, granting at the same time a plentiful supply of pure water. Give of castor-oil a teaspoonful or thereabouts, according to age and strength. Do not scrape the tongue, nor use rough modes of cleaning it, but apply a little *borax*, dissolved in tincture of myrrh and water, by means of a camel-hair pencil, two or three times a-day. We should here observe that the symptoms of *pip* consist in a thickening of the membrane lining the tongue and palate, which causes an obstruction to free inspiration, and makes the poor sufferer gasp for breath; the plumage becomes ruffled, the bird mopes and pines, the appetite fails and is at last utterly extinguished, the bird at length dying, worn out by fever and starvation.

There is a very fatal disease called

GAPES (INFLAMMATION OF THE TRACHEA)

to which all our domestic gallinaceous birds, as well as pheasants and partridges, are subject, and which often occasions great mortality. In the first instance it appears to arise from a croupy or catarrhal affection, which is indicated by running at the nostrils, watery eyes, alteration of voice, and loss of appetite and spirits. The bird dies. If the trachea be examined it will be found replete with narrow worms, about half an inch in length, imbedded in slimy mucus. This singular worm is the *syngamus trachealis* or *distoma lineare*. It consists of a long and short body united together; the long body is the female, the short body the male, each, were it not that they are permanently united together, being an animal distinct and perfect in itself. Whether these parasitic worms are the cause or consequence of the disease we pretend not to say, nor can we tell how they become introduced into the trachea; this, however, seems certain, that their removal is requisite to give the feathered patient a chance of recovery. This can be done by means of a feather, neatly trimmed, which is to be introduced into the windpipe and turned round once or twice and then drawn out; it will dislodge the worms and bring back many of them adhering with slime unto it. This plan requires great dexterity and some knowledge of the anatomy of the parts; a slow unskilful operator may kill the already half-suffocated bird instead of curing it. Another mode of destroying these worms is by putting the birds in a box, and making them inhale the fumes of tobacco, thrown into it through the stalk of a tobacco pipe. Some recommend the forcing of tobacco smoke down the bird's throat, and others that the mouth be crammed with snuff, while many place faith in the efficacy of a pinch of salt introduced into the back part of

the mouth. Let us suggest something like a scientific mode of treatment. Give a grain of *calomel* made up with bread into a pill, or two or three grains of Plummer's pill (*pil. hydr. submur. co.*, London Pharmacopœia), after which let flower of sulphur be administered, with a little ginger, in pulaceous food composed of barley-meal. In the meantime let the bird be kept in a dry warm shed or room apart from the rest of the fowls, as we suspect the disease to be infectious. Let the mouth and beak be washed with a weak solution of chloride of lime. In what *roup* (not the inflammation of the tail gland, often so called) differs from this laryngeal disease we do not know; we suspect the word to be a corruption of *croup*, and this latter term is truly applicable to the malady in question. Wet, ill-feeding, an ill-ventilated fowl-house, confinement on a spot or plot of ground tenanted year after year by fowls without attention to cleanliness, to renovation of the soil, and a proper allowance of gravel, ashes, fresh vegetables, &c., these are the causes which produce this and many other diseases. At the same time be it observed, the gapes is an epidemic disease, and often thins the preserves of pheasants and the coverts of partridges. We think, but will not speak positively, that it prevails more especially after rainy seasons, or during the continuance of unusually damp, foggy, and chilly weather. With regard to pheasants, we recommend high feeding as a preventative; as for partridges and grouse, they feed more at will than do pheasants, which latter may be said to be in a state of almost semi-domestication, and under surveillance.

INFLAMMATION OF THE LUNGS,

including the bronchial tubes, is not uncommon. Its symptoms are quick breathing, often with a rattle or râle very audible, dulness, disorder of plumage, vacancy in the eye, and indisposition to stir. Death is not to be prevented by any remedy we can point out. Why then should we pretend to enlarge in a series of directions? Human patients can explain their feelings, cattle to a certain degree indicate them, and speak in dumb eloquence; but birds give little indications by voice or manner leading to what the medical man calls a *diagnosis*. Besides, how are we to bleed a bird. Few, perhaps, have had more experience with respect to birds, or dissected more, than the writer, and yet we cannot lay down any directions on the point. In fact, the skin of most birds is very thin, it is unsupported by a thick mass of cellular tissue, and the vessels which ramify upon it are minute, none presenting a fair chance for successful venesection. To cut and wound a bird at random for the purpose of obtaining a flow of blood is barbarous.

PERITONEAL INFLAMMATION, OR PERITONITIS.

This disease runs so rapid a course, that death not unfrequently occurs, before any marked symptoms have appeared indicative of active disease. The bird, perhaps, appears a little drooping, it refuses to eat, but as it is highly fed this circumstance occasions no surprise, it retires to its roost, and is found dead in the morning. Examination at once reveals the cause of death; the peritoneal membrane exhibits all the indications of active inflammation. We have noticed the occurrence of the same disease among carnivorous mammalia. An animal appears to be as well as usual, at least it attracts no observation, but it dies suddenly. On opening the body the cause is manifest—*Peritonitis* has done its work.

The same observations apply to

INFLAMMATION OF THE HEART AND PERICARDIUM.

Of this disease we have seen no example in the common fowl, but several times in parrots, and also in caged mammalia. The symptoms are obscure, and as for treatment, even could we determine the existence of the disease, nothing that we are aware of can be of any real service.

INFLAMMATION OF THE MUCOUS MEMBRANE OF THE INTESTINAL CANAL

is usually evinced by *Dysentery*. The bird pines, it is purged, in a little time the evacuations become more or less tinged with blood, and death ensues. Damp and improper food are the causes of this affection. It can be treated with success only in the early stage. First give a small quantity of castor-oil, this will clear the bowels of irritating secretions, afterwards let the bird have doses of the *Hydrargyrum cum cretâ* (of the London Pharmacopœia), rhubarb, and laudanum—

Of the hydr. cum creta,	3 grains.
„ rhubarb	2 or 3 grains.
„ laudanum	2, 3, or 4 drops.

Mix in a teaspoonful of gruel, or gum-water. To be given once or twice a-day.

SIMPLE DIARRHŒA

may be generally cured by a change of diet, and a little chalk given in gruel.

CONSTIPATION OF THE BOWELS

will yield to castor-oil, and a diet upon oatmeal porridge and green vegetables.

We have seen both fowls and pigeons affected with a sort of

ASTHMA,

evidenced by difficulty of breathing and a wheezing rattling noise, on inspiration. It is the result of a thickening of the bronchial tubes from previous in-

flammation, often accompanied by an alteration in the structure of the cellular tissue of a portion of the lungs. We can lay down no rational plan of treatment likely to effect a cure.

INFLAMMATION AND INTUMESCENCE OF THE RUMP GLAND

is generally symptomatic of a febrile condition of the system. To this affection the term *roup* (an indefinite term for all the diseases of poultry) is often applied. The treatment is simple; let the swelling be opened by a lancet, and the matter gently squeezed out; afterwards foment well with warm water, put the bird upon a diet of oatmeal and green vegetables, and if necessary give a teaspoonful of castor-oil. Be sure that the roosting place is clean and well ventilated.

MOULTING.

This process is natural, and consists in the gradual exchange of old feathers for new ones, nevertheless it often happens that birds in a state of domestication, especially while young, have not sufficient vital energy for the accomplishment of the change. They require improved diet, warmth, and good water; of course we suppose that their roosting place is properly sheltered and ventilated; a grain or two of cayenne pepper made into a pill with bread, may be given daily with advantage; saffron is useless, but a nail or any bit of iron may be put into the drinking-trough, in order to render the water chalybeate.

Fowls are subject to a *loss of feathers*, which must not be confounded with moulting. At first the plumage appears ruffled and disarranged, then the feathers begin to drop out, and continue to fall till the bird is greatly denuded; in the meantime it is dull and destitute of appetite, and becomes thin and feeble. We have generally observed this disease among poultry kept in a

limited space, debarred from exercise and good air, with a wet soil beneath them, having little or no gravel, nor any dusting place in which to clean their plumage. This disease is analogous to the mange in cattle, and is not easily cured—a change of diet, good air, cleanliness, and a dusting place (or as some call it, a *dust-bath*), are essential; some recommend small quantities of sulphur and nitre mixed with butter to be daily given.

A sudden *change in the colour of the plumage*, from fear, has been occasionally known to take place. We knew an instance of this kind in Essex; a cock belonging to a friend was dreadfully frightened by a dog, if we remember rightly, and became white, but he recovered his natural plumage on the next moult. In the *Proceedings of the Zoological Society* for 1835, p. 54, the following note, extracted by Sir Robert Heron, Bart., from his journal, is not without interest:—"1821-2. A black Poland cock belonging to my friend and neighbour, Mr. Kendall, of Bansley, was seized last winter, near the house, by a fox, but his screams being heard by the servants, he was rescued, desperately wounded, with the loss of half his feathers. In time the remainder of his feathers came off, and he is now become perfectly white." This seems to have some relation to the human hair becoming white at once from fear.

In concluding our account of the common fowl, we cannot omit to notice that hybrids between this bird and the pheasant are by no means uncommon as curiosities. We have seen several from time to time in the gardens of the Zoological Society of London, but there is nothing in them to claim admiration. They have neither the resplendent plumage nor the slim delicate contour of the pheasant, nor yet the proud and easy carriage of the fowl. They are unproductive, at least between themselves, nor are we sure that they will interbreed either with the pure fowl or pheasant.

CHAPTER IV.

HISTORY OF THE TURKEY, THE PEAFOWL, THE GUINEA-FOWL, AND THE CURASSOW.

THAT it should be difficult if not impossible to trace the progress of the domestic fowl, from its aboriginal seat to the remote regions of Western Europe, will not excite surprise, when we consider the remote epoch at which it became reclaimed, and the many changes of empires, and nations, and tongues, and the loss of records throughout the vast regions of Asia and Europe. But that we cannot fix the precise time, nor can learn any of the circumstances which relate to the introduction of the turkey into Europe, may cause some astonishment, when we reflect that its intro-

duction must have occurred at some period after the conquest of America, and not probably till after a considerable lapse of years, and the establishment of the Spaniards in Mexico. Cortes, in 1519, landed at the place where Vera Cruz now stands, but it was not until after two years of laborious warfare that the Spanish power became in the ascendant, and opened the way for Spanish emigration to Mexico. There is, however, reason to believe that previously to the Spanish conquest the turkey was in a domesticated condition, both in Mexico and in the adjacent islands, for Oviedo,

who embarked for the West Indies in 1514, and resided as governor of the Fort and Harbour of St. Domingo, in the island of Hayti, then called Hispaniola, published among other works (some very voluminous) one entitled *Tradado de la Natural Historia de las Indias*, which was published at Toledo in 1526. In this work he describes the turkey as a kind of peacock abounding in New Spain, whence numbers had been transported to the islands and the Spanish main, and were domesticated in the houses of the christian inhabitants. It must be observed that he calls the whole of that part of America *las Indias*, the Indies, and also *las Indias occidentales*, the West Indies (a name still applied to certain islands), hence perhaps the terms *Coq d'Inde*, *Gallo d'India*, and *Indianische Hahn*, originally arose—terms, however, which if they did thus originate, seemed to have conveyed a general idea of this species being the native of Asiatic India; and under this impression, and that it was a bird known to the Greeks and Romans, a bird, as the fable states, into which the sisters of Meleagre were transformed, while weeping for the loss of their brother, it obtained, among the learned, the title of *meleagris*.

Belon was one of the first who considered the turkey to be the *meleagris* of the ancients, and this is the more extraordinary as he was a scholar of eminence, and the passages in which the *meleagris* is mentioned, sufficiently prove that it could not have been a turkey. Aldrovandus, Gesner, and others followed in the wake of Belon. Linnæus, though unfortunately he retains the name of *meleagris*, stamping the error thereby with the weight of his authority, well knew that the turkey was a native of the New World, for he places its *habitat* "in America Septentrionali;" he was also perfectly aware that it was the parent stock of the domesticated breed, for he gives brief but excellent directions for the care of the young, and expressly mentions their favourite food—"Pulli delectantur allio, urticâ; a fame et pluvîâ cavendi," that is, the young relish the onion and the nettle, and must be taken heed of against hunger and rain. It is generally known that curd, the green part of onions chopped small, and boiled nettles, are among the best kinds of food for turkey chicks, whose very existence depends upon regular feeding and protection from rain. Barrington (1781) is the last writer of any note who supported the theory that the turkey was the *meleagris* of the ancients. It is true that when he wrote the existence of the large flocks in a wild state in North America was not generally known, though many of the older writers (Lawson and others) mention them. Pennant in a masterly manner exposes the errors of this theory, which was once so generally entertained; and in the

present day we can only wonder that it was ever entertained. We must, however, remark that M. Temminck, in the fourth part of his *Manuel* (1840), quotes M. Cantraine, who states that the inhabitants of Sicily and Dalmatia declare that wild turkeys have been killed in those countries. M. Temminck justly considers these statements as very doubtful; but, allowing them to be true, there would be nothing to prove that these wild or feral birds are not the descendants of individuals which had escaped from the dominion of man, and, favoured by climate, soil, and productions, multiplied a race exempt from his immediate jurisdiction. In the island of Hayti the Guinea-fowl, originally brought with negro slaves from Guinea, is now wild; but what is more, wild turkeys formerly tenanted Richmond Park, and especially Windsor Forest; and there is no doubt that if some of the wild stock from America were procured and turned into the royal forests, or such parks as some of our nobility possess, under proper care and surveillance, they would make a noble addition to the birds included under the head of "game;" they would be even more independent than pheasants. Even the domestic breed (the bronzed-black being preferred) might be very soon brought to return to their wild habits, and would in a very short time stock the woods with an independent progeny.

With respect to the generic title, *meleagris*, so unfortunately adopted by Linnæus, it is now generally received, and any attempt to change it would be useless; this, indeed, is of the less consequence, as it can no longer mislead—we only smile at the erroneous theory of Belon, Gesner, and Aldrovandus.

The English name, turkey, it is somewhat difficult to account for, except on the supposition that it was generally believed to come from that country; perhaps, however, it was given because the bird was a stranger, in the same way as we apply the term Goth to men rude and barbarous in their habits, or the term Turk, to persons of a savage and tyrannical disposition; words often become perverted from their original signification and merge into nicknames expressive of supposed qualities or conditions of things. About the time when this bird appears first to have been known in England, the Turkish power was held in dread in Europe. The sultan, Soliman or Suliman the Great reigned from 1520 to 1566; his fleet was then the first in the world, and the scourge of the Mediterranean; his ships ravaged the coasts of Italy and Spain, and his armies laid waste the territories of Hungary and some adjacent parts of Germany, and the dread of the Turks was universal over Europe. It might be that the outlandish aspect of this bird, its deep guttural notes, its haughty carriage, and irascible disposition, led to

the imposition of the name. But, whatever gave rise to this appellation, certain it is that the present species was the subject of much confusion and doubt among the earlier modern ornithologists, whose learned discussions tended to perplex rather than clear up any points of difficulty. John Walcott, a writer on British birds, 1789, says, "The turkey was first brought to England about the year 1521," but he gives no authority. It is certain that in the reign of Henry VIII. the turkey was pretty general in England. In his history of the carp (*British Fishes*), Mr. Yarrell quotes an old couplet which runs thus:—

"Turkeys, carps, hops, pickerell, and beer,
Came into England all in one year."

"The old couplet (adds Mr. Yarrell) is certainly erroneous; pike or pickerell were the subjects of legal regulations in the time of Edward the First. Carp are mentioned in the *Boke of St. Albans*, printed in 1469. *Turkeys* and hops were unknown till 1524, previous to which wormwood and other bitter plants were used to preserve beer; and the parliament, in 1528, petitioned against hops as a *wicked weed*. Beer was licensed for exportation by Henry the Seventh in 1492, and an excise on beer existed as early as 1284, also in the reign of Edward the First."

About the year 1524, then, as it would appear, the turkey was introduced into our island, but whether from Spain, or direct from America, we cannot tell. However, the species soon began to multiply, a fact which evinces the attention paid to it, for, as we shall have to notice more explicitly, the successful rearing of broods is by no means easy, from the extreme tenderness of the young. In 1541, we find the turkey enumerated among the luxuries of the table; Archbishop Cranmer (*Leland's Collectanea*) ordered that at festivals there should be no more than one dish of cranes, swans, and turkey cocks. In 1555, two turkeys and two turkey poults were served up at the inauguration dinner of the Sergeants at Law in London; they cost four shillings each, while the swans were rated at ten shillings, and the capons at half-a-crown (*Dugdale, Orig. Jud.*) In 1573, Tusser, in his "*Five hundred Points of good Husbandry*," mentions these birds as forming part of the Christmas fare of the farmer. At what period France and Germany received the turkey, we cannot exactly discover, but most probably at about the same period as England. Everywhere its intrinsic value would make it acceptable, and cause it to be treated with the most careful attention.

The dispersion of the turkey is not, however, so complete as that of the fowl. In India, Colonel Sykes informs us that it is reared in great numbers by the Portuguese, and that it is met with only in a domestic state (*Catal. of Birds of Dukhun*,

Zool. Proceeds. 1832, p. 151). We cannot learn that it is reared in China, where the fowl and duck abound, nor does it appear to have a place among the domestic birds of Persia, though in Mr. Kitto's account of Palestine both the turkey and the peacock are mentioned. There is a story told in a work called the *Sketches of Persia*, which runs to the following effect. When two English gentlemen, who were on their way to the city of Shiraz, arrived at the town of Kazeroon, they heard so strange an account of two remarkable creatures that were to be seen at a village fifteen miles distant, that they determined to go and see them. "They are very like birds (said their informants), for they have feathers and two legs; but then their head is bare and has a fleshy look, and one of them has a long black beard upon his breast;" but the chief point on which they dwelt, was the strangeness of their voice, unlike that of any other bird they had ever heard or seen. An old man, who had gone all the way from Kazeroon to see them, said that the sound was very much like that of the Arabic language, but added, that though he had listened to them with the greatest attention, he had not been able to understand a word they said. As it was very unpleasant weather, and the roads were exceedingly bad, the Englishmen were much fatigued by the time they got to the village in which the strange creatures were. The people of the village took them to the house where the animals were kept, the door was opened, and out marched a turkey cock and hen. The former seemed to rejoice much in his release from his confinement, and began to gobble his Arabic with great vehemence. Though vexed at having taken a tedious journey for nothing, yet the travellers could not help laughing at the *dénouement*. The people were, however, exceedingly surprised, when informed that these strange creatures were very common in India and England. It seemed that the birds had escaped from a vessel which had been wrecked in the Gulf of Persia, and had gradually made their way to the place where they then were.

Although, as we have said, the exact time and the circumstances, under which the turkey was introduced into the various countries of Europe, are in some obscurity, still the wild origin of the domestic stock is not only well known, but still abounds in some of the wooded districts of North America remote from colonization.

The genus *meleagris* belongs to the family *pavonidæ* of Swainson, and appears to be united on the one side, through the horned pheasant of the Himalaya, genus *tragopan*, to the more typical *phasianidæ*, and on the other to the peacock, and more typical *pavonidæ*, through the Chinese peacock-pheasants, genus *polyplectron*, birds of exquisite plumage.

The genus *meleagris* is thus characterized:—Bill strong, curved, convex, and vaulted, its base furnished with a naked skin; a fleshy caruncle surmounting the bill, of an erectile nature, conical in form, and greatly developed in the male; head and neck surrounded by a wrinkled mammillated or carunculated skin, changeable in its colour from pale pink to scarlet and violet, and hanging in loose folds or racemous clusters over the upper part of the breast; a tuft of long black bristly hairs, or rather hair-like feathers, on the breast of the male, above the upper edge of the sternum; tarsi strong, armed in the male with a short stout spur, which in birds of a year old is merely a rudiment; hind toe touching the ground; middle of the anterior toes much longer and stouter than the two external; claws large, arched, and thick; country North America, especially the southern and western districts.

Two species only are known to naturalists, viz. *meleagris gallopavo*, the origin of the domestic stock, and *meleagris ocellata*, a bird which in the metallic splendour and varying tints of its plumage rivals the peacock.

It is to the former of these species that our chief attention will be directed, but as we cannot omit some notice of the latter, we shall make a few observations upon it before we attend to the common wild turkey, although it is of far more recent discovery, and therefore ought in strictness to be the second in rotation.

1. The HONDURAS TURKEY (*Meleagris ocellata*, Cuvier *Mém. Mus.*; vi. pl., col. 112).

No one who has seen specimens of this splendid bird can hesitate to acknowledge its specific distinctiveness from the common wild turkey—not more distinct is the golden pheasant from the common, than the Honduras turkey from its more extensively spread relative.

The first specimen which appeared in this country was one exhibited in Bullock's Museum, and which, at the sale of that rich collection, was allowed to pass from England to Paris, and is now in the national museum of that capital. Its capture occurred as follows:—The crew of a vessel were cutting wood in the Bay of Honduras, when three individuals in full splendour made their appearance. One of these they managed to capture alive, and it was destined as a present to Sir Henry Halford. Unfortunately, it met with an accident while the vessel was in the Thames, which caused its death. Sir Henry presented it to Mr. Bullock, who then exhibited his museum in the Egyptian Hall, Piccadilly. Fortunately, there is at the present time a noble specimen in the British Museum.

The Honduras turkey is inferior to the common turkey in size, nor is the tail so much developed; but what pencil can do justice to its

refulgence? The metallic hues and iridescence of its plumage rival those of the humming bird. The following is a portion of Cuvier's description, and may serve to convey an idea of its beauty:—The feathers generally are rounded at the ends, those of the lower part of the neck, upper part of the back, scapulars, and all the lower part of the body bronze green, with two terminal bands, the first black, the last, or that next the tip, of a golden bronze hue. The tints on the other parts of the back are the same, but near the tail-coverts they are more vivid, the bronze becoming of a rich blue or emerald green, according to the incidence of the light, whilst the outer band becomes broader and more golden. Red mingles with the tints on the rump, where the plumage almost assumes the brilliant character of that of some of the humming birds, and the bright border is separated from the blue by a band of velvety black. The hidden part of each feather is gray, mottled with black; and, indeed, upon the tail and upper coverts this gray is shown forming bars, one of which immediately succeeding the blue band, surrounds it and gives each feather an ocellated appearance. The tail coverts and lower feathers of the rump are so disposed that there are four rows with these ocellated tips. The tail, consisting of fourteen feathers only, is rounded. Lower parts of the body banded with bronze black and green, but wanting the lustre of the upper parts. Quills and spurious wing black edged obliquely with white, which occupies the external margin of the first almost entirely. Outer webs of the secondaries pure white, not showing the bands on the centre when the wings are closed; the uppermost blotched in the centre with black shot with green, which, as the feathers shorten, extends more over their surface, so as to leave only a white edge. Greater coverts chestnut. Feet and legs lake red. Except, perhaps, in some of the dense untrodden woods of Yucatan and of Central America, from Cape Honduras to the tenth or thirteenth degree of latitude, north, this bird might be sought for in vain. Even in these countries it is probably rare, excepting in isolated spots, where it roams remote from human habitations. Of its peculiar habits and manners nothing is positively known. We may, however, suppose them to resemble, to a great degree, those of the common species. Could it be naturalized in our island, or in Europe, what a splendid addition we should have to the list of our domestic poultry! Could it be introduced as a semi-wild bird in the parks of royalty and nobility, what a glorious species would be added to the list of "game!"

2. The COMMON TURKEY (*Meleagris gallopavo*).—As this species is confessedly the origin of all our domestic varieties, a description of it as it exists

in a state of nature cannot but prove interesting. Bartram, the Prince of Canino, and Audubon, have given graphic pictures of the habits of this bird, founded upon actual observation of the flocks in their native woods, and upon these authorities must our history be founded.



WILD TURKEY.

The wild turkey closely resembles the bronzed black breed of our island, but the tail is always terminated by a broad dusky yellow band, above which is a narrow mottled band, and above this a broad band of black. The following description of the male, female, and young of the wild bird is taken, with some abridgment, from the Prince of Canino (Charles Lucien Bonaparte):—

The *male* wild turkey, when full grown, is nearly four feet in length, and more than five in extent of wing. The irides are dark brown. The head (which is very small in proportion to the body) and half of the neck are covered by a naked bluish skin continued over the upper half of the neck and uneven with warty elevations, changeable red on the upper portion and whitish below, interspersed with a few scattered black hairs. The flaccid and membranous naked skin, also changeable on the lower part of the neck, extends downwards into large wattles. A wrinkled conical fleshy protuberance, capable of elongation and with a pencil of hairs at the tip, takes its rise from the base of the bill, where the latter joins the front. When this excrescence is elongated under excitement, it covers the bill and depends several inches below it. A tuft of long rigid black hair springs from the lower part of the neck at its junction with the breast, shooting out from among the plumage to the length of nine inches. The base of the feathers of the body, which are long and truncated, consists of a light fuliginous down; this part of the feather is succeeded by a dusky portion, which is again followed by a broad shining metallic band, varying from copper colour or bronze to violet or purple, accord-

ing to the play of the light, and the tip is a broad velvety band; but this last is absent in the feathers of the neck and breast. The general plumage presents a glancing metallic lustre, which is, however, least glossy on the lower part of the back and tail coverts. The wings are concave and rounded, not extending much if at all beyond the base of the tail. Quills twenty-eight; primaries blackish banded with white, secondaries whitish banded with blackish, tinged towards the back particularly with brownish yellow. Tail fifteen inches in length at least, rounded at the extremity; the feathers eighteen, broad, and capable of expansion and elevation into a fan-shape. The general colour of these feathers is brown mottled with black, crossed by numerous narrow, undulating lines of the same. There is a broad black band near the tip, then a short mottled portion, and lastly a broad dingy yellowish band. The bird stands rather high on its robust red legs, the scales of which have blackish margins, and the blunt spurs are about an inch long; the claws are dusky. Bill reddish, but horn-coloured at the tip.

The *female*, at the age of about four or five years, attains her full size and colouring. At this age hens have the pectoral fascicle of hair developed to the extent of four or five inches, which, according to Mr. Audubon, they exhibit a little in the second year if not barren. But this fascicle is much thinner than that of the male. Barren hens do not obtain this distinction until a very advanced age, and, being preferable for the table, the hunters single them from the flock, and kill them in preference to the others. The female wild turkey is more frequently furnished with the hairy tuft than the tame one, and this appendage is gained earlier in life. The great number of young hens without it has, no doubt, given rise to the incorrect assertion of a few writers that the female is always destitute of it. The weight of the hen generally averages about nine pounds avoirdupois, but Mr. Audubon has shot barren hens in strawberry time weighing as much as thirteen pounds. The irides are similar in colour to those of the male. Bill and spurless legs less stout. Head and neck with less of naked skin, being partially covered with dirty gray feathers. Those on the back of the neck have brownish tips, and so produce a longitudinal band there; the short caruncle on the front is incapable of elongation. Prevailing hue of plumage dusky gray, each feather having a metallic band duller than in the male, then a blackish band, and lastly a grayish fringe. The blackish band is almost obliterated on the neck feathers and under surface. The whole plumage is more sombre than that of the male; there is less white on the primaries, and there are no bands on the secondaries.

The colour of the tail is much as it is in the male. Length not exceeding three feet and a quarter.

The *young* of both sexes resemble each other so closely before the naked membrane acquires its tinge of red as to be scarcely distinguishable. The females, however, when a few days old, are somewhat larger than the males, and have a weaker piping note. The males then begin to stand higher on their legs, which are stronger than those of the females, and soon exhibit the rudiments of spurs. On the approach of the first winter, the young males show a rudiment of beard or fascicle of hairs on the breast, consisting of a mere tubercle, and attempt to strut and gobble. The second year the hairy tuft is about three inches long; in the third the turkey attains its full stature, though it certainly increases in size and beauty for several years longer. The concealed portion of the plumage on the anterior portion of the back is sprinkled with pale ferruginous, which disappears as the bird advances in age.

The weight of the hen, as we have said, averages about nine pounds, but the males far exceed the females, and differ considerably in bulk and weight. "From the accounts," says Bonaparte, "which I have received from various parts of the Union, fifteen or twenty pounds may be considered a fair statement of their medium weight; but birds of thirty pounds are not very rare, and I have ascertained the existence of some weighing forty. Mr. Audubon saw one in the Louisville market that weighed thirty-six pounds. The pectoral appendage of this bird measured more than a foot in length."

The older writers appear to have been given to exaggeration, for they describe the weight of male turkeys as amounting to fifty or even sixty pounds. It is not unlikely, however, that they were deceived by erroneous information, or that they gave the weight of the birds by guess.

M. Duponceau, so well known by his philological researches, has given a table of the names of the wild turkey in twenty-six Indian languages. From these, for curiosity's sake, we shall select a few examples:—Algonkin, *mississay*; Cherokee, *kainna, ocoocoo*; Creeks, *pinewau*; Ossage, male, *sukah-tingah*, female, *inchuga-sukah*; Ottos, *wak-kung-ja*; Unquachog (Long Island), *nahiam*; Choctaws, *oopuk*—(English pronunciation).

The wild turkey is a noble bird, far exceeding its domestic relative both in size and beauty. Crosses, however, in America often take place between the wild and tame race, and are highly valued, both for external qualities and for the table. Indeed, in districts where the wild turkey is common, such crosses are very frequent, the wild male driving away his domesticated rival, and

usurping the sultanship of the seraglio. Eggs of the wild turkey have been frequently taken from their nests, and hatched under the tame hen. The young preserve a portion of their uncivilized nature, and exhibit some knowledge of the difference between themselves and their foster mother, roosting apart from the tame ones, and in other respects showing the force of hereditary disposition. The domesticated young reared from the eggs of the wild turkey are often employed as decoy birds to those in a state of nature. Mr. William Bloom of Clearfield, Pennsylvania, caught five or six wild turkeys when quite chickens, and succeeded in rearing them. Although sufficiently tame to feed with his tame turkeys, and generally associate with them, yet they always retained some of their original propensities, roosting by themselves, and higher than the tame birds, generally on the top of some tree or of the house. They were also more readily alarmed. On the approach of a dog, they would fly off and seek safety in the nearest woods. On an occasion of this kind, one of them flew across the Susquehanna, and the owner was apprehensive of losing it. In order to recover it, he sent a boy with a tame turkey, which was released at the place where the fugitive had alighted. This plan was successful. They soon joined company, and the tame bird induced his companion to return home. Mr. Bloom remarked that the wild turkey will thrive more and keep in better condition than the tame on the same quantity of food.

The native country of the wild turkey extends from the north-western territory of the United States to the Isthmus of Panama, south of which it is not to be found, notwithstanding the statements of authors who have mistaken the curassow for it. In Canada and the now densely-peopled parts of the United States, wild turkeys were formerly very abundant, but, like the Indian buffalo, they have been compelled to yield to the destructive ingenuity of the white settlers, often wantonly exercised, and seek refuge in the remotest parts of the interior. Although they relinquish their native soil with slow and reluctant steps, yet such is the rapidity with which settlements are extended and condensed over the surface of this country, that we may anticipate a day at no distant period when the hunter will seek the wild turkey in vain.

The wooded parts of Arkansas, Louisiana, Tennessee, and Alabama, the unsettled portions of the states of Ohio, Kentucky, Indiana, and Illinois, the vast expanse of territory north-west of these states, on the Mississippi and Missouri, as far as the forests extend, are more supplied than any other parts of the Union with this valuable game, which forms an important part of the subsistence of the hunter and traveller in the

wilderness. It is not probable that the range of this bird extends to or beyond the Rocky Mountains. The Mandan Indians, who a few years ago visited the city of Washington, considered the turkey one of the greatest curiosities they had seen, and prepared a skin of one to carry home for exhibition.

In Florida, Georgia, and the Carolinas, the wild turkey is not common, and still less so in the western parts of Virginia and Pennsylvania. Some, however, are said to exist in the mountainous districts of Sussex County, New Jersey.

The wild turkey is irregularly migratory, as well as irregularly gregarious. Whenever the forest fruits (or mast) of one portion of the country greatly exceeds that of another, thither are the turkeys insensibly led. By gradually meeting in their haunts with more fruit, the nearer they advance towards the place in which it is most plentiful. Thus, in an irregular manner, flock follows flock, until some districts are deserted, while others are crowded with an influx of arrivals. "About the beginning of October," says Audubon, "when scarcely any of the seeds and fruits have fallen from the trees, these birds assemble in flocks, and gradually move towards the rich bottom lands of the Ohio and Mississippi. The males, or, as they are more commonly called, the *gobblers*, associate in parties of from ten to a hundred, and search for food apart from the females, while the latter are seen either advancing singly, each with its brood of young, then about two-thirds grown, or in union with other families, forming parties often amounting to seventy or eighty individuals, all intent on *shunning the old cocks*, which, when the young birds have attained this size, will fight with and often destroy them by repeated blows on the head. Old and young, however, all move in the same course, and on foot, unless their progress be interrupted by a river, or the hunter's dog force them to take wing.

"When they come upon a river, they betake themselves to the highest eminences, and there often remain a whole day, and sometimes two, as if for the purpose of consultation. During this time the males are heard gobbling, calling, and making much ado, and are seen strutting about, as if to raise their courage to a pitch befitting the emergency. Even the females and young assume something of the same pompous demeanour, spread out their tails, and run round each other, purring loudly, and performing extravagant leaps. At length, when the weather appears settled, and all around is quiet, the whole party mounts to the tops of the highest trees, whence at a signal, consisting of a single *cluck*, given by a leader, the flock takes flight for the opposite shore. The old and fat birds easily get over, even should the river be a mile in breadth, but the younger and

less robust frequently fall into the water—not to be drowned, however, as might be imagined; they bring their wings close to their body, spread out their tail as a support, stretch forward their neck, and striking out their legs with great vigour, proceed rapidly towards the shore; on approaching which, should they find it too steep for landing, they cease their exertions for a few moments, float down the stream until they come to an accessible part, and, by a violent effort, generally extricate themselves from the water. It is remarkable that, after immediately crossing a large stream, they ramble about for some time, as if bewildered. In this state they fall an easy prey to the hunter.

"When the turkeys arrive in parts where the mast is abundant, they separate into smaller flocks, composed of birds of all ages and both sexes, promiscuously mingled, and devour all before them. This happens about the middle of November. So gentle do they sometimes become after these long journeys, that they have been seen to approach the farm-houses, associate with the domestic fowls, and enter the stables and corn-cribs in quest of food. In this way, roaming about the forests, and feeding chiefly on mast, they pass the autumn and part of the winter."

The season of courtship begins about the middle of February. The females now separate from the males, whom they endeavour to shun, but by whom they are perseveringly followed.

At this time the males begin to gobble strenuously, and to strut about, making that peculiar whirring jar with their wings, striking the quill feathers smartly on the ground, which all must have observed in the domestic bird. They utter a succession of puffs from the lungs. They spread out and erect the tail, and draw back the head, while the loose skin of the neck swells and assumes the colour of scarlet. Thus they make advances to the females, who roost apart, uttering occasional call-notes, to which every male within hearing loudly responds, several hastening to the spot whence the call proceeded, eager to pay their homage. Thus it happens that the males frequently meet each other, in which case desperate conflicts ensue, ending often in bloodshed, and often in the loss of life, the weaker falling under the blows inflicted on his head by his stronger rival. In the combat they use beak and wings and spurs, striking and pulling each other, the feathers being ruffled, the tail partly raised, and the wings held drooping, ready for a blow.

Old females, when addressed by the male, strut about almost as proudly as he does, and more than half way meet his ardent advances; but females under a year old are not to be won so easily. The solicitations of the male, under these circumstances, are more pressing and more ener-

getic, till at length he ingratiates himself in her favour. Thus they are mated for the season, though the male, being polygamous, does not confine himself to one female, but solicits the kindness of as many as he chances to meet. The seraglio follow their favourite sultan, roosting at night near him, if not on the same tree. This unitedness lasts, however, only for a short time, for as soon as they begin to lay they gradually leave his company, and indeed sedulously avoid him, except for a few hours during the day, and make their nests in some concealed spot, among logs, brushwood, and intertangled foliage, in order that they may escape not only the eye of the crow, who is a great devourer of the eggs of the turkey, but that also of the male turkey, who, if he were to find them, would, from jealousy, infallibly break them all. At last the males find themselves altogether deserted. Their mutual rivalry ceases; they meet each other in peace, and cease to utter threats of mutual defiance; they seek retired situations in order to rest and recruit their energies, for at this juncture, like worn-out rakes, they are utterly exhausted, and have lost flesh and activity. When recovered and improved in condition, they draw together again, and commence their wanderings in united parties.

It is generally about the middle of April that the female begins to select a site, and arrange her rude nest, which consists simply of withered leaves, in some depression on the ground amidst dense brushwood, or in such an obscure place as the locality affords. The eggs, like those of the domestic bird, are of large size, and of a dull or cream white, minutely freckled or dotted with reddish brown; their average number varies from ten to fifteen. While the gradual addition of egg to egg is going on, the hen displays surprising instinctive caution. On leaving her charge she is careful to cover the whole with dry leaves, so artfully disposed as to render it difficult even for one who has watched her movements to find the nest, and on returning to it she varies her route, scarcely ever returning to it twice by the same course. Hence it is mostly by accident that the nest of the hen is discovered. It not unfrequently happens that several hens associate together and form a common nest, probably for mutual aid and assistance, and rear their broods together. Mr. Audubon says that he once found three hens sitting on forty-two eggs. In such cases one of the females at least is ever on guard, no raven or crow then daring to invade it. While in the act of incubation the hen is not readily driven from her nest by the appearance of danger. A person walking carelessly along, as if taking no particular notice, may pass a nest within five or six paces, the female crouching low to avoid observation; but, as Mr. Audubon has ascertained, if a person

make his approach in a stealthily searching manner, she will quit it while he is yet thirty yards distant, and assuming a stately gait will move away, uttering every now and then a clucking note, probably hoping by this means to draw off the intruder and baffle his search. We learn from the same writer that the hen seldom or never abandons her nest if it has been discovered by man, but that if a snake or any other animal has sucked any of the eggs she leaves it altogether. Under such circumstances, or when the eggs have been removed, she seeks the male, and recommences the preparation of another nest; but as a rule, she lays only a single batch of eggs during the season. When the eggs are on the eve of hatching, the female will not leave her nest under any circumstances while life remains; she will even allow an enclosure to be made around her, and thus be as it were imprisoned, rather than seek her own safety by flight. Mr. Audubon says, "I once witnessed the hatching of a brood of turkeys which I watched for the purpose of securing them together with the parent. I concealed myself on the ground within a very few feet, and saw her raise herself half the length of her legs, look anxiously upon the eggs, cluck with a sound peculiar to the mother on such occasions, carefully remove each half empty shell, and with her bill caress and dry the young birds that already stood tottering and attempting to make their way out of the nest. I have seen them all emerge from the shell, and in a few moments after, tumble, roll, and push each other forward with astonishing and inscrutable instinct."

Before leaving the nest with her young brood, the female shakes herself, adjusts her plumage, and appears roused to the exigencies of the occasion; she glances upwards and around her, in the apprehension of enemies, and as she moves, cautiously along keeps her brood close about her; her first excursion is generally to a little distance only from the nest, to which she returns with her brood to pass the first night. Subsequently they wander to a greater distance, the hen leading her charge over dry undulating grounds, as if aware of the danger of damp and humid spots. Wet indeed is fatal to young turkeys while covered only with down; hence in very rainy seasons the broods become greatly thinned, for the young, if once completely wetted, seldom recover; their vital energies sink under the abstraction of caloric during evaporation.

At the age of a fortnight, the young birds begin to use their wings; hitherto they have rested on the ground, but now they begin to roost on the low branch of some large tree, crowding close to each side of the mother, and sheltered beneath her broad wings. They now wander about more freely, visiting the glades and open lands border-

ing the woods in search of wild strawberries and other fruits, grasshoppers, the larvæ of ants and other insects, and roll themselves in the sand and dust in order to clear their growing feathers of loose scales and parasitic vermin; deserted ants' nests are favourite dusting places.

By the month of August the young birds have acquired considerable growth, and use their wings and legs with great vigour and readiness, so that they are able to escape the sudden attack of foxes, lynxes, and other beasts of prey, by rising quickly from the ground, and mounting the tallest branches of trees. The young cocks now begin to show their distinctive characteristics, and even to utter an imperfect gobble, while the young hens pur and leap. Several broods now flock together, and so continue united, till after the October migration, and through the winter, when they leave the females, the middle of February bringing a recurrence of the same scenes already described. The young hens in their turn are to become parents, and the young cocks will fight for the mastery.

When, during the winter, a sharp frost succeeds a heavy fall of snow, so as to form a hard crust on its surface, turkeys will sometimes remain on their roosts for three or four days or longer, declining to search for food, unless indeed when farms and barns are within a short distance; they then direct their course to the stacks of corn, and enter the barns and stables in quest of grain. During melting snow-falls, turkeys will travel very great distances, and at such extraordinary speed that no hunter can keep up with them. They have then a dangling, straggling way of running, which, awkward as it may seem, enables them to outstrip any other animal. "I have often," says Audubon, "when on a good horse been obliged to abandon the attempt to put them up, after following them for several hours. This habit of continued running in rainy or very damp weather of any kind is not peculiar to the wild turkey, but is common to all gallinaceous birds. In America the different species of grouse exhibit the same tendency."

The wild turkey in its native woods has numerous enemies. Setting aside man, the lynx, the snowy owl, and the Virginian owl are amongst the most dreaded; to the eggs and young, the raven, the crow, and the polecat are fatal, but from these the old birds have little to fear personally. The lynx follows the wandering flocks, and lies in ambush for them, springing upon the first within his range of bound, and seizing it before it has time to use its wings and mount into a tree. Turkeys, while pluming, dusting, and enjoying themselves in the sun, are often suddenly pounced upon by this animal and fall a sacrifice.

It is at night, and while sleeping perched on the branches of the trees, that turkeys are most obnoxious to the attacks of the large owls, birds nearly equalling an eagle in size and quite as ferocious. It is well for the turkeys that they roost in flocks, are easily roused, and have ears always on the *qui vive* against danger. On silent wings, and with eyes intent upon the branches of the forest below him, while the moon is half hidden by clouds, sails the Virginian owl, greedy for prey. He is hovering over the slumbering party, reconnoitering their position, in order to make an attack with the greatest certainty of success. Yet hovers he not so silently as not to awaken with the slight whirr of his wings one of the sleeping turkeys; the slumberer is at once aroused to a sense of his danger, and with a single cluck gives the horrid alarm, and every sleeper starts upon his legs. Anxiety and fear are in every breast, each bird keeps its eye upon the dreaded foe as it wheels around; it has selected its victim—down it swoops with inconceivable velocity, but the turkey is prepared; as the foe descends it depresses its head and, crouching low, spreads its broad tail invertedly over its back as a shield of defence. Down swoops the owl, but its assault is useless; it has slid along the smooth inclined plane of the caudal shield, and before it has time to recover itself and renew the assault the turkey has dropped to the ground, and, *minus* a few feathers, has shrouded itself unhurt amidst the densest brushwood. It must not, however, be supposed that the turkey always thus parries the assault of its enemy; on the contrary, numbers annually fall a prey to this rapacious bird. Nor are wild turkeys alone subject to the attacks of this daring marauder; domestic turkeys belonging to lone farm houses often become his prey. Audubon, in his description of the Virginian or Great Horned Owl (*Strix Virginia*, Gmelin), indulges in a passage, relative to its annoyance to the farmer, of such eloquence that we may be readily pardoned for quoting it, the rather as it will show against what enemies, as far as turkeys are concerned, the agricultural settler in America has to be upon his guard. We omit the history of the owl as foreign to our subject.

"It is during the placid serenity of a beautiful night, when the current of the waters moves silently along, reflecting from its smooth surface the silver radiance of the moon, and when all else of animated nature seems sunk in repose, that the Great Horned Owl, one of the Nimrods of the feathered tribes of our forests, may be seen sailing silently and yet rapidly on, intent on the destruction of the objects destined to form his food. The lone steersman of the descending boat observes the nocturnal hunter, gliding on extended pinions across the river, sailing over one hill and then another, or suddenly

sweeping downwards, and again rising in the air like a moving shadow, now distinctly seen, and again mingling with the sombre shades of the surrounding woods fading into obscurity. The bark has now floated to some distance and is opposite the *newly cleared patch of ground*, the result of a squatter's *first attempt at cultivation* in a place lately shaded by the trees of the forest. The moon shines brightly on his hut, his light fence, the newly planted orchard, and a tree which, spared by the axe, serves as a roosting place for the scanty stock of poultry which the new-comer has procured from some liberal neighbour. Amongst them rest a turkey hen, covering her offspring with extended wings. The great owl, with eyes keen as those of any falcon, is now seen hovering above the place. He has already espied the quarry, and is sailing in wide circles meditating his plan of attack. The turkey hen, which at another time might be sound asleep, is now, however, so intent on the care of her young brood that she rises on her legs and purs so loudly, as she opens her wings and spreads her tail, that she rouses her neighbours, the hens, together with their protector. The cacklings which they at first emit soon become a general clamour. The squatter hears the uproar, and is on his feet in an instant, rifle in hand; the priming examined, he gently pushes open his half-closed door, and peeps out cautiously to ascertain the cause by which his repose has been disturbed. He observes the murderous owl just alighting on the dead branch of a tall tree, when raising his never failing rifle, he takes aim, touches the trigger, and the next instant sees the foe falling dead to the ground. The bird is unworthy of his further attention, and is left a prey to some prowling opossum or other carnivorous quadruped. In this manner falls many a horned owl on our frontiers, where the species abounds."

With respect to the attacks of man on the flocks of the wild turkey, little need be said; man is ingenious in the arts of destruction. Baited traps or *pens*, of various kinds according to locality, are much used, in which numbers of birds are taken; during spring a lure or *call* made from one of the bones of a turkey's wing is in requisition, this skilfully managed produces a sound similar to that of the call-note of the female, and will bring the males around within reach of gun-shot; afterwards, when the males are weak, many are hunted down by dogs, and at all times the gun is in requisition. In fact it is almost a matter of surprise that the wild turkey, thinned as its numbers annually are by sportsmen of all kinds and descriptions, should yet maintain its ground; certain it is that, unless specially protected, it will at no very distant date become either extremely rare, or utterly extinct, as the capercaillie is in the highlands of Scotland.

Thus far have we given a sketch of the general history of the wild turkey, and we shall find that the tame variety resembles its unreclaimed progenitor in most of its marked peculiarities, viz., in its rambling habits, its manner of roosting, the antipathy of the males to the eggs, often to the young, in the secrecy in which the female prefers to incubate, and in the tenderness of the young.

The DOMESTIC TURKEY can scarcely be said to be divided like the common fowl into distinct breeds; there is, indeed, considerable variation in colour, and some little in size, but no Bantam or dwarf race, as far as we have seen, exists. The finest and strongest turkeys are those of a bronzed black, resembling as closely as possible the original stock; they are not only reared the most easily, but are the largest, and fatten the most rapidly. We have seen turkeys of a coppery tint, others of a delicate fawn colour, others parti-coloured, gray and white, and some few of a pure snowy white. We regard all these as inferior to the black, their colour indicates something like degeneracy of constitution, and we should say that they are seldom very large sized.

A very curious variety, unknown in England, is described by M. Temminck; it was kept in Madame Backer's aviary at the Hague. The bird had a top-knot springing from the crown of the head; in the same aviary was a flock of turkeys of a pale reddish tint, with an ample crest of pure white, which were reared also by Madame Backer. We have here an analogy between this lady's breed of turkeys and the plumed Poland fowls.

To describe the domestic turkey is superfluous; the voice of the male, the changing colours of the skin of the head and neck, his proud strut with expanded tail and lowered wings jarring on the ground, his irascibility, which is readily excited by red or scarlet colours, are points with which all are conversant. Turkey cocks are pugnacious and vindictive, and often ill-treat the hens; we have known them to attack children, and have witnessed combats between them and the game cock, in which the latter was more oppressed by the weight of his antagonist than by gladiatorial skill—we have, in fact, seen the bulky hero worsted; he cannot use his spurs with the address exhibited by the game cock, which moreover fights with method.

The adult turkey is extremely hardy, and bears the cold of our winter with impunity; during the severest weather flocks, as we have seen, will roost at night upon the branches of tall trees, preferring such an accommodation to an indoor dormitory. We have witnessed a tall tree crowded on its *higher* branches with turkeys, while on the *lower* branches roosted a flock of Guinea-fowls. The impatience of restraint and restlessness of the turkey render it unfit company for fowls in their

dormitory; in fact, the fowl-house is altogether an improper place for these large birds, which require *open sheds and high perches*, and altogether as much freedom as is consistent with their safety. Although, as we have said, turkeys will roost even during the winter months on trees, we by no means recommend that this should be allowed, the feet of these birds are apt to become frost-bitten from such exposure to the air on the sudden decline of the temperature to the freezing point, while a keen north or east wind is blowing; it must be remembered that the domestic turkey, hardy as it is when adult, is not equal in point of endurance to its wild relative bred in the woods and inured to the elements.

Turkeys are fond of wandering about hedge-rows and the borders of fields, they love to visit turnip fields, where, besides the leaves of the turnips, which they relish, they find insects, snails, slugs, &c., which they greedily devour. In the morning they should have a good supply of grain, and after their return from their peregrination another feed; by this plan not only will the due return home of the flock be insured, but the birds will be kept in good store-condition, and ready at any time to be put upon fattening diet. Never let them be in poor condition—this is an axiom in the treatment of all poultry—it is difficult, and takes a long time, to bring a bird into proper condition which has been previously poorly fed or half starved.

In the choice of store-birds some care is requisite; the stock should be of a good sort, if possible of the black Norfolk race, produced originally, we believe, by a cross with the wild breed of America. And we may here observe that could this cross be often repeated (and our wealthy agriculturalists should be urged upon this point), not only would our breeds of turkeys become in all respects improved, but the chances of ultimate degeneracy would be obviated. The Irish turkeys are generally very fine, but the French, as far as we have seen (but we may be wrong), are altogether inferior to our best sorts, and are seldom or never to be seen of great weight; that is averaging from twenty to thirty pounds.

The cock should be vigorous, broad in the breast, clean in the legs, with ample wings, and a well developed tail-plumage, his eyes should be bright, and the carunculated skin of the neck full, and rapid in its changes of colour. Though capable of assuming his legitimate rank among the hens when a year old, he is not in perfection (notwithstanding the contrary opinion of some) until he has attained his third year and is entering upon his fourth, and he continues in his prime for three or four succeeding years. Thus, for two or three or four years, or longer, may all the young cocks be devoted to the poulterer, one per-

haps of particular beauty being preserved within that space of time for the ornament of the farm-yard.

The hen should be dark coloured, like the cock—those with white feathers appearing amidst the black plumage should be rejected; her figure should be plump, and her actions lively and animated. The hen breeds when a year old, or rather in the spring succeeding that in which she herself left the egg, but she is not in her prime until the age of two or three years, and will continue for two or three years more in full constitutional vigour. But whether the breeder prefers to keep a store-stock for several years, or prefers a yearly or biennial change, will depend on his views and the general practice of the neighbourhood around him; for ourselves, we should keep a first-rate cock for three or four years, or even longer, however we might change our store-flock of hens, and, indeed, if these produced first-rate chickens we should be in no hurry to substitute younger birds in their place. Of course the stock, whatever its prescribed number may be, should be kept up, deficiencies by death and accidents being duly supplied.

It would appear that an almost unlimited number of hens may be allowed to a single male—in fact the caresses of the male only once or twice are required for the fecundation of all the eggs which she will lay during the current season; but, in order to make assurance doubly sure, the number of hens under one lord may be limited to fifteen or twenty—that is, if it is desirable that as many should be kept.

About the middle of March, generally speaking, the female commences laying; she indicates this coming event by a peculiar cry, by strutting about with an air of self-satisfaction, and often by prying into out-of-the-way places, evidently in quest of a secret spot of incubation—for her instinctive dread of the male is not removed by domestication, nor has the male lost his antipathy to the eggs. She should now be closely watched, and some management is required to induce her to lay in the nest assigned to her. The nest should be prepared of straw and dried leaves, it should be secluded, and to excite her to adopt it, an egg, or a piece of chalk cut into the form of an egg should be placed in it. When her uneasiness to lay is evident, and symptoms prove that she is ready, she should be confined in the shed, barn, or place in which her nest (in a large wicker basket) is prepared, and let out as soon as it is deposited. It is generally in the morning that the turkey hen lays, and mostly every other day, though some lay daily, until the number amounts to from fifteen to twenty. As the eggs are laid it is as well to remove them (leaving the decoy egg or piece of chalk) until the number is complete, as

they are liable to be broken, and to be sucked by rats or weasles. They may then be restored to her for incubation. The turkey hen is a steady sitter, and in this respect resembles the wild bird—nothing will induce her to leave the nest; indeed, she often requires to be removed to her food, so overpowering is her instinctive affection; she must be freely supplied with water within her reach; should she lay any eggs after she has commenced incubation, these should be removed—it is proper therefore to mark those which were given to her to sit upon. The hen should now on no account be rashly disturbed, no one except the person to whom she is accustomed, and from whom she receives her food, should be allowed to go near her, and the eggs, unless circumstances imperatively require it, should not be meddled with.

On the thirty-first day the chicks leave the eggs. Now, in a state of nature the wild hen always manages at this juncture far better than she would do if interfered with by man, were his interference possible, and so we believe will the domestic turkey hen, if her nest be placed (and it might be in a certain degree) as it is in nature; this we know, that turkeys which have laid their eggs in out-of-the-way places, and have been allowed to incubate there, have brought their troop of downy younglings into the farm-yard with evident pleasure and satisfaction—no extra attention having been paid to them. It is, however, usual to remove the young chicks one by one as they make their exit, and place them in a basket of warm flannel, tow, or feathers, until all are out, and then to restore them to the hen; this is done as a precautionary measure, lest any accident should happen to them. In a state of nature the turkey only rears one brood during the season, unless her eggs have been destroyed or removed, nor will the domestic hen incubate twice, if allowed to rear her own brood; some, however, who like, as the common phrase is, “to work a willing horse to death,” recommend that the turkey be induced to hatch a second time in the season. This is effected by taking her young brood from her as soon as possible, and mixing it with another brood of the same age, as nearly as possible; her cares being no longer required for her young, and her instincts unsatisfied, she seeks the company of the male, and in about three weeks again commences laying, until the number of eggs is complete, when she re-engages in the task of incubation. But we utterly object to this practice—it is cruel, and it taxes the system; she has already sat patiently for thirty days, that is four weeks and two days, and surely that is quite enough. Besides, the brood thus hatched will be late in the season, and late broods of turkeys are not to be reared without very great care; they cannot stand the chilly mornings of autumn nor the frosty nights,

their limbs become swollen and rheumatic, and they die one after another, few surviving, and those few never becoming fine healthy birds from which the breeder would select his stock. Let nature alone. Should a hen lay after hatching her clutch of eggs, and should she (which is very unlikely) indicate a desire for incubation, it is better to prevent her, and use the eggs for household purposes.

The treatment of the chick next demands consideration. We have seen that even the wild chicks are delicate, and unable to endure wet. We may say the same with regard to young grouse and partridges, the flocks of which are much thinned by a wet season. But if the wild chicks are tender, much more so are those of the domestic strain. As in the case of young fowls, the turkey chicks do not require food for several hours. It is useless to cram them, as some do, fearing lest they should starve; and, besides, the beak is as yet so tender that it runs a chance of being injured by the process. When the chicks feel an inclination for food, nature directs them how to pick it up. There is no occasion for alarm if for thirty hours they content themselves with the warmth of their parent, and enjoy her care. Yet some food must be provided for them, and this should be, of course, suited to their nature and appetite. Here, too, let the simplicity of nature be a guide. We say this because some have recommended spices, wine, and even bathing in cold water. Mr. Richardson states, on authority which he has received, that in Sweden some persons practise the plan of immersing the *chickens in cold water*. His words are—

“Miss N. thus writes: The following curious mode of rearing turkeys is translated from a Swedish book, entitled *Rural Economy*:—‘Many of our housewives have long despaired of success in rearing turkeys, and complained that the profit rarely indemnified them for their trouble and loss of time; whereas little more has to be done than to *plunge the chick into cold water* the very hour, if possible, but at least the very day, it is hatched, forcing it to *swallow one whole peppercorn*, after which let it be returned to its mother. From that time it will become hardy, and fear the cold no more than the hen’s chick; but it must be remembered that this useful species of fowl is subject to one particular disorder while they are young, which often carries them off in a few days. When they begin to droop, examine carefully the feathers on their posterior extremity, and you will find two or three whose quill part is filled with blood. *Upon drawing these the chick recovers*, and after that requires no other care than what is commonly bestowed upon other poultry that range the court-yard. The truth of these assertions is too well known to be denied; and, as a convincing proof of the success (of this mode of treatment), it

will be sufficient to mention that three parishes in Sweden [why not name?] have for many years used this method, and gained *several hundred* pounds by rearing and selling turkeys brought up in this manner.'"

Some other observations are added unworthy notice; and indeed, from the recommendation of a two years' feed on *sunflower seeds* (in Sweden), we consider the whole as a piece of English quackery. We dare stake our reputation that no such book has been written in Swedish and published in Sweden. The lady (Miss N.) has been made, we suspect, the dupe of some wag; but if indeed and truly such directions have been given (we have inquired in vain for the work *Rural Economy*, trans. from Swedish), then all that we can say is, that the science which the Swedes have ever exhibited in rural affairs has degenerated. We will not even comment on the directions. Their absurdity is palpable. Mr. Richardson discusses the passage seriously. We should have deemed it below notice, only that so able a writer has condescended to comment upon it.

The first diet offered to turkey chicks should consist of eggs boiled hard and finely minced, or curd with bread crumbs, boiled nettles, and the green part of onions, parsley, &c., chopped very small, and mixed together so as to form a loose crumbly paste. Barley or oatmeal, kneaded with a little water, and mixed with the pulp of potatoes and Swedish turnips, to which chopped beet leaves are added, may be also given. They will require water, but this should be put into very shallow vessels, so as to insure against the danger of the chicks becoming thoroughly wetted. Fresh milk is apt to disagree with the young birds, and is not needful. Both the turkey hen and her chickens should be housed for a few days. They may then, if the weather be fine, be allowed a few hours' liberty during the day; but, should a shower threaten, they must be put immediately under shelter. This system must be persevered in for three or four weeks. By this time they will have acquired considerable strength, and will know how to take care of themselves. On the first drops of a shower they will run for shelter into their accustomed place of refuge, which should be warm and waterproof. As they become older, meal and grain may be given more freely. They now begin to search for insects, and to dust their growing plumage in the sand. At the age of about two months, or perhaps a little more, the males and females begin to develop their distinctive characteristics. In the young males the carunculated skin of the neck and throat, and the horn-like contractile comb on the forehead, assume a marked character. This is a critical period. The system requires a full supply of nutriment, and good housing at night is essential. Some recommend

that a few grains of cayenne pepper, or a little bruised hempseed, be mixed with their food. The distinctive sexual marks once fairly established, the young birds lose their name of *chicks*, or *chickens*, and are termed *turkey poults*. The time of danger is over, and they become independent, and every day stronger and more hardy. They now fare as the rest of the flock, on good and sufficient food, if their keeper is alive to his own interest. Let us again repeat it, that a man who keeps poultry on meagre, spare, innutritious diet, will never rear fine poultry, and never repay himself even for his niggardly outlay. Poultry should never be in bad condition. Let them not be kept at all unless they are kept properly.

Now, as turkeys are reared expressly to grace the board (though not often the farmer's, even at Christmas-tide, as Tusser indicates), their mode of treatment for this *finale* requires some notice. Let us take a young poult of three months old, hatched in April, destined to be the head dish of some goodman's table in December. The first part of its education is passed through—what remains? First, then, it will require a mixture of boiled vegetables, as nettles, turnip-tops, cabbage sprouts, and the like, boiled down, and given with meal of various kinds—barley-meal, oat-meal, or wheaten flour, the whole being well blended (with curds, if they can be obtained or spared); but with this diet will be mixed pure grain of various kinds—buck-wheat, barley, oats, beans, and (if the plant were largely grown in England) sunflower seeds, not excluding potatoes steamed, boiled carrots, turnips, and the like. The run of a substantial farm-house is the main thing at this epoch. But secondly comes the question, how to prepare for the Christmas market? Some cram their turkeys. The birds should never need this operation. Cobbett says that, as to fattening turkeys, the best way is never to let them be poor. "Cramming is a nasty thing, and quite unnecessary. Barley-meal, mixed with skim-milk, given to them fresh and fresh, will make them fat in a short time, either in a *coop*, in a *house*, or *running about*. Boiled carrots and Swedish turnips will help, and it is a change of sweet food. In France they sometimes pick turkeys alive, to make them tender; of which I shall only say, that the man that can do this, or order it to be done, ought to be skinned alive himself."

We have never in France seen turkeys so treated, but often pigeons; and on one occasion we remonstrated against this horrible barbarity, but without effect. The poulterer seemed to think that pigeons had no feeling; and so do those who skin living eels at our door. Cobbett objects to cramming, and not without reason; but then, after all good feeding, cramming is still practised—cramming to finish off good feeding. This is

unnecessary; but as weight, irrespective of delicacy of flavour, pays the London poulterer, the heaviest birds are to him the most acceptable. We opine that a medium is to be observed in the preparation of all animals for the market, and therefore think that the cramming of well-fed turkeys is useless. Nevertheless it is extensively practised. The unfortunate birds are condemned to darkness or twilight. They are forced with balls of barley meal—sometimes even deprived of sight (horrible barbarity). There is no necessity that either fowls or turkeys should be blinded and crammed. The whole affair is truly disgusting to any feeling and well-regulated mind. All animals will fatten, with proper food, quite sufficiently for all really useful purposes. According to Mr. Dickson, “no food makes their flesh whiter and more delicate than kitchen-stuff or the dregs of melted tallow, more or less of which must be boiled according to the number that is to be fed; and being diluted in a boiling state, plants (especially nettles chopped up) and pot-herbs are to be mixed with it. The whole being well boiled, barley-meal or maize is added, to form a kind of paste, which may be given twice a-day at least—in the morning and at one o’clock—when it is wished to render them fat. But as the dregs of melted tallow are not everywhere to be procured, the dregs or refuse of the oil of nuts, linseed, or sweet almonds may be substituted, the greatest care being taken not to fatten them wholly with such oily substances, for their flesh would partake of the flavour, and be injured.” There is no doubt that *greaves*, *oil-cake*, and the like, will render turkeys fat with considerable rapidity; but they should be given sparingly, otherwise the flesh will be rank and disagreeable.

Though the turkey feeds on a vast variety of diet, as mast, corn, sunflower seeds, barley, and oatmeal, green vegetables, snails, insects, &c., still there are some things which, if not positively poisonous, are at least injurious to this bird, and should therefore never be given. We allude to peas, vetches, and tares, and indeed most sorts of pulse. These, says Mr. Richardson, are little less deleterious than such well-known poisons as hemlock, foxglove, or henbane. Yet these form the favourite food of the pigeon.

With respect to the diseases of the turkey, we must refer to our general observations on the maladies of poultry, having, as far as these birds are concerned, nothing in particular to notice. We have laid sufficient stress upon the care which the young require, and their tenderness until they become poults.

We may conclude our history of the turkey by observing, that extraordinary accounts of the weight of fattened birds sometimes appear either in the public papers or in the works of writers

who know nothing personally of the subject. We have been told of turkeys weighing fifty or sixty pounds; and indeed, in the Christmas of 1846-7, we were presented by a relative with a noble turkey, one of his own breeding in Derbyshire. He estimated its weight at twenty-five pounds. On trial it was little more than seventeen—so easily are persons deceived. Rarely have we seen a turkey of twenty-five pounds, and still more rarely one of thirty. Yet instances have been known in which a prize bird has weighed nearly thirty-five. The large turkeys which are sent from Norfolk, the great county for these birds, at Christmas, are cocks of the preceding year, and are about twenty months old. We received last Christmas a male bird of the year from the Isle of Wight, which exceeded fifteen pounds. We are not, however, aware that the beautiful Isle of Wight is famous for turkeys. As for that, any place in which turkeys are properly reared and fed may compete with Norfolk. We have seen very fine birds in Surrey, and no farther distant from London than in a farm-yard at Barnes. Even in the Peak of Derbyshire, cold and changeable as the climate is, a relative of the writer possessed, when we visited him, as fine a flock of turkeys and Guinea-fowls as any one could have desired; but he took a *pride* in them, and therein lies the great secret of success in the rearing, not only of domestic poultry, but of our domestic quadrupeds also. What is worth doing is worth doing *well*.

THE PEAFAWL.

The PEAFAWL (*Pava cristatus*); Saxon, *pawa*; Belgic, *paww*; Teutonic, *pfau*; French, *paon*; Italian, *pavon* and *pavone*; Latin, *pavo*; Greek, *ταῖον* (*taïon*); *mohr* of the Mahrattas.

It is from India undoubtedly that Europe has received the peacock, and that at a very early period. It was well known to the Greeks and Romans. It was the bird of Juno, who adorned its tail with the hundred eyes of Argus—eyes which the poet calls star-like gems.

“Excipit hos, volucrisque suæ Saturnia pennis
Collocat; et gemmis caudam stellantibus implet.”
OVID.

That the peacock should, in all times, have been admired for its singular beauty is not surprising. When it moves along in state with its wings lowered to the ground and its tail spread, the rays of the sun glancing upon its gorgeous plumes, iridescent with metallic effulgence, the eye of every beholder is arrested, and all gaze with admiration on the glorious spectacle. When we talk of the peacock spreading its *tail*, we use popular language. The gem-adorned plumes, with their loose silken barbs, are not the tail, but the tail coverts. The tail is beneath these, and hid-

den by them, and consists of rather short stiff rust-coloured feathers, which serve as a support to the train. Gilbert White, in his *Natural History of Selborne* (Letter XLIV.), thus expresses himself:—

“Happening to make a visit to my neighbour’s peacocks, I could not help observing that the trains of those magnificent birds appear by no means to be their tails, those long feathers growing not from their *uropygium*, but all up their backs. A range of short, brown, stiff feathers, about six inches long, fixed on the *uropygium*, is the real tail, and serves as the *fulcrum* to prop the train, which is long and top-heavy when set on end. When the train is up, nothing appears of the bird but its head and neck; but this would not be the case were these long feathers fixed only in the rump, as may be seen by the turkey-cock when in a strutting attitude. By a strong muscular vibration, these birds can make the shafts of their long feathers clatter like the swords of a sword-dancer. They then trample very quick with their feet, and run backwards towards the females.”

The true tail feathers are eighteen in number, and the head is surmounted by an aigrette of twenty-four upright feathers. The female has the aigrette, but not the splendid colour and ornamental plumes with which the male is gifted. Her colours generally are sombre.



THE PEACOCK.

The peacock is too well known to require a detailed description. Pied varieties are not unfrequent in domestication, and we have seen some of a snow white; but, in our eyes, the most beautiful are those which display their natural colours, unbroken by any intermixture.

The peacock is extensively spread, in a wild state, in India and the Indian Islands. It is abundant in the dense woods of the Ghauts, and is readily domesticated, many of the Hindoo temples in the Dukhun, as Colonel Sykes informs us, having considerable flocks of them. On comparing specimens of the wild bird with the ordinary domesticated peafowl of our country, he found no difference in any respect. “Irides intense red brown,” or rather, we should say, blood red.

The wild peafowl associates in numbers, and where a favourite feeding ground invites them, hundreds sometimes collect together, but they are very wary, and run with extreme velocity.

Colonel Williamson, in his account of peacock shooting, states that he has seen them in astonishing numbers about the passes in the Jungletary district. Whole woods were covered with their beautiful plumage, to which the rising sun imparted additional brilliancy; he states that small patches scattered about, cultivated with mustard which was then in bloom, induced the birds to collect there for the sake of feeding on the plant, and he speaks of the beauty of the scene as enchanting, and so indeed it must have been, for he adds, “I speak within bounds when I assert that there could not be less than twelve or fifteen hundred peafowls of various sizes within sight of the spot where I stood for near an hour.”

Some observations which Colonel Williamson makes we do not quite understand. He says that it is easy to get a shot in a jungle, but that where the birds flock together to the amount of forty or fifty there is greater difficulty. They are not then so easily raised, and they run so fast that the colonel doubts whether a spaniel could make them take wing. We suppose he means that single birds started in a jungle and forced to flight afford a fair mark, but that it is not easy to start birds when collected together in open grounds. He also observes that they fly *heavy* and *strong*, generally within an easy shot; if winged only, they mostly escape from their swiftness of foot. Now the peacock flies, indeed, strongly, but not heavily, indeed its flight is rather buoyant considering its size; of course we are only judging of domestic birds, never having seen wild birds in the jungles of India; but undoubtedly the wild bird is far superior in powers of flight to its domestic relative.

The following picture of one of the jungles in India, by an anonymous writer, may not here be out of place:—

“The jungle-fowl was heard on every side, while occasionally the shrill scream of a peafowl broke from the more retired heights, and seemed attuned by nature to the wild and beauteous world about me. Sounds depend too much on locality and association for me to ask for sympathy with

my fondness for the pea-fowl's note, but I love to hear it, and as it broke upon me yesterday I really felt something like pain as I smiled and muttered Burns's complaint,—

'Ye'll break my heart, ye little birds!'

There is a spot near Mulkapoor that I always see when I hear or think of them. Every cleft of a wall of rocks that rose four hundred feet seemed crushed full of the noblest trees, and from every crevice long pliant grass hung waving lazily in the air. We stood silently gazing on the calm yet savage sublimity of this scene, till some one said, 'How beautiful!' and at once the words were thrown back by a startling harshness from the masses before us, as if they mocked at the applauses of such atoms of humanity. At this moment a peafowl screamed, and *launching itself into the air, floated forth in majestic buoyancy*, hopelessly high above our heads, while a dozen echoes returned its cry from side to side, filling the space through which it passed with their wild commingled peals. If my reader remembers why I quitted India, I can forgive him muttering 'Voilà un homélie qui sent furieusement la fièvre,' and therefore to business. Touching peafowl shooting, though I have seen seven on a table at once, I am convinced that a man who does not find a repaying pleasure in merely following these birds as they strut in all their splendour of plumage up their wildly picturesque haunts, ought to fix on some other sport; he will find this too tantalizing. Results may be much more surely calculated on amongst the jungle-fowl, by ascertaining by successive cries the way they walk, and hurrying through the cover by a circuitous route, so as to intercept them. But this requires a certain tact. The slightest stir, and often the keenness of the bird's sight, for they come slowly and look well round as they strut and flap their wings and challenge, are enough to discover the sportsman, when the crowing ceases, and they are off at a hopeless rate. These birds are the original cock and hen, but neither their cry nor their plumage is exactly that of a domestic fowl. Whoever looks for them will see black partridges and spur-fowl running about the base of the rocks. The latter has double spurs and is of a dusty brown plumage brightening on the breast to amber, and prettily picked out with white and black spots. A sportsman in thick jungle should have one beater behind him to strike a bush if necessary, but his plan is to walk on as quietly as possible, and keep ready to fire at the moment a turn or opening shows an object. This, and the poaching system of lying hid, are the only ways to secure game in thick jungle, and even with these he will often return empty-handed and learn to consider a peafowl or a brace of jungle-fowl as a very satisfactory day's work."—*New Monthly Magazine*.

The wild peacock has its native foes irrespective of man—the great destroyer; the leopard often surprises it in the dense jungle, even the tiger darts upon it from ambush; but in Ceylon, as the natives assert, it often falls a prey to a lemurine animal termed the loris (*loris gracilis*), a small nocturnal and arboreal animal of insidious habits, which to look upon (for we have seen living specimens in the Zoological Gardens) would seem incompetent to the work of destruction with so large a bird as its antagonist. While the peafowl sleeps unsuspectingly on its perch, this slow-paced creeping animal makes its advances by stealth, gradually and noiselessly it attains its mark, the bird awakes grasped tightly round the throat and in the agonies of strangulation; it at once drops to the ground, but, clinging to it with strenuous gripe, and supported by its victim, down drops the loris; they do not here part; the bird soon expires, and the loris devours its brain, leaving the rest of the carcase untouched, an acceptable meal to some prowling marauder of the forest.

We would here willingly give an account of the habits and manners of the wild peafowl in the jungles of India, parallel to that of the wild turkey of the American forests, but no Wilson, Audubon, or Bonaparte, has written their history, and, for ourselves, we have never seen the peafowl in its native woods. We might, indeed, transcribe much respecting peafowl shooting from the works of various writers, sportsmen in India; but from all this we gain no positive information. Our readers must therefore pardon us for our meagre history of the wild bird. However, what it is in captivity in our country, that it is in the forests of India; domestication has little influenced its nature.

There can be little doubt that the splendour of this bird first attracted the notice of the ancients, yet, in luxurious Rome, its beauty was not its safeguard; on the contrary, it was slaughtered in very wantonness, for the sake of a few parts only deemed worthy of being introduced as small items in the dishes of royal lunatics or noble madmen, for such only can we deem them. The sneer of Martial must in his day have been biting; he saw the peacock in its glory, and then beheld it murdered for the sake of its brains. Well might he say—

"Miraris quoties gemmantis explicat alas,
Et potes hunc sævo tradere, dure, coquo."

Lines which we may thus paraphrase—

"Oft as the bird his gem-starred plumes displays
In admiration dost thou stop to gaze,
And canst thou then, hard hearted, take its life,
And coolly give it to your hireling's knife."

One of the favourite dishes of the Emperor Vitellius, called the buckler of Minerva, was prepared

with the livers of a choice fish, the scarus (*scarus Creticus*, Cuvier), the tongues of flamingoes, and the brains of peacocks. The bird figured also in the feasts of Hortensius and other sensualists.

We seldom hear of peafowl being served up at table, yet young birds are juicy and of high flavour; no one, however, in the present day thinks of breeding these gorgeous birds for the sake of their flesh, and an accident only has enabled us to say that we have tasted a young peafowl. Now, Lesson says, "Leur chair est sèche et coriace, leur cri est rauque et désagréable," and no doubt the flesh of an old bird, like that of an old fowl, is very indifferent; but that of a young bird is sapid and tender, with a *game* flavour. As for the cry of the peacock, though it is horrid to most ears, we do not altogether object to it; we like the cawing of multitudinous voices in a rookery, and we like the mingled noises of a farm-yard, which mellow even the dissonant scream of the peacock. Heard amidst the wild and savage scenery of the native woods and jungles of this gorgeous bird, well must it harmonize with the scene; there is much in association, and we would ask, would the finest air of any of our greatest composers, played on what instrument you please, produce in the passes of the Ghauts so consonant an effect as the wild yell of the peacock?

In ancient times no great feast in the baron's hall was ever served up without this bird to grace it—it was presented by the sewer, well cooked, on a large dish, but rearranged in its gorgeous plumage; and before the peacock and the ladies did the adventurous knight make his vow.

The habits and manners of the peafowl in domestication are well known; it is a rambling bird unsuited for confined premises, it requires lawns, and shrubberies, and wide pleasure grounds, to which it adds an appropriate charm, whether it moves about with its train expanded or walks trailing it along, down avenues of smooth turf, or amongst the woodland glades. Semi-wild, however, as the peacock is, it is nevertheless disposed to become familiar, and if encouraged will visit the windows of the house in order to receive an accustomed dole of bread, and when displaying its plumage seems to be aware of the admiration it inspires.

Grain of various kinds, mast, fruits, insects and their larvæ, together with small reptiles, constitute its food. It is not until the third year that the male acquires his glorious plumage, the aigrette on the head in this species (but not in another from Japan) is composed of miniature plumes, similar to those of the train. The tarsi are spurred, and when irritated the peacock can use them with full effect.

We have stated that the turkey likes to roost in the high branches of trees, the peacock affects

still higher branches, and failing these, the gable end of a house or barn, or some elevated situation, and here through summer and winter will it take its station, defying the rain and the cold. Strange that a bird originally from India should be so hardy; it would seem as if Providence had expressly given to the gallinaceous birds that quality of constitution which fits them for accompanying man into regions far remote from their natural *habitat*; such is the case indeed with all animals essentially subservient to his welfare, and we cannot but see in this fact a proof of the wisdom and goodness of that God who commanded man "to replenish the earth and subdue it."

Though the peafowl roosts in trees, the female incubates on the ground, making in her natural state a rude inartificial nest, in some secluded spot under cover of the dense jungle. The eggs vary in number from five to ten. This concealment, as in the instance of the turkey, is necessary, for actuated by a strange jealousy the male will break all the eggs if he discover them, and this feeling actuates our domestic birds, insomuch that the female during incubation must be placed in such security as to prevent the access of the male to the nest. Eggs, grayish white; period of incubation, thirty days.

In the *Proceedings of the Zoological Society* for 1835 (p. 54) occurs the following passage from the journal of Sir Robert Heron, Bart.:—"For a good many years I have attended to the habits of peafowl, and for the last eleven have written down my observations. I find the individuals to differ as much in temper as human beings; some are willing to take care of the young ones of others, whilst some have pursued and killed them, and this whether they had a brood of their own or not. Some cocks have assisted in the care of young ones, whilst others have attacked them. An early hen frequently has a brood herself the next year. Age makes no difference in the number of the brood; I have had six from a hen a year old, and one from an old hen. The hens have frequently a great preference for a particular peacock. They were all so fond of an old pied cock that one year when he was confined in view, they were constantly assembled close to the trellice walls of his prison, and would not suffer a japanned peacock to touch them. On his being let out in the autumn, the oldest of the hens instantly courted him, and obtained proofs of his love in my presence. The next year he was shut up in a stable, and the hens then all courted his rival, for the advances in these birds are always made by the female.

"The japanned breed are, I believe, a variety originating in England. In Lord Brownlow's numerous breed of common white and pied, the japanned suddenly in my memory appeared

amongst them. The same thing happened in Sir J. Trevelyan's flock of entirely the common sort, also in a breed of common and pied, given by Lady Chatham to Mr. Thornton, and in both cases to the extinction of the previously existing breed."

We have noticed that tame peafowls are extensively kept in India, and the same observation applies to Persia, where the turkey is scarcely known. In that country as in England the peacock is kept extensively as an ornament to pleasure grounds and gardens. An anonymous writer observes that the King of Persia has a throne called the throne of the peacock, on account of two artificial birds intended to represent peacocks, which are placed on square pillars on each side of the seat. These birds are studded with precious stones, and each of them holds a large ruby in his beak. In China the peacock commands equal admiration, and ornamental articles, as screens, &c. are made from its plumes, and mounted on ivory.

As is the case with the common fowl, the female peafowl occasionally assumes the plumage of the male, and in these instances the ovary will be found diseased. Thus, "Lady Tynte had a favourite pied pea-hen, which produced chickens eight several times. John Hunter relates that this bird having moulted when about eleven years old, the lady and family were astonished by her displaying the feathers peculiar to the other sex, and appearing like a pied peacock. In this process the train, which became like that of the cock, first made its appearance after moulting. In the following year, having moulted again, she produced similar feathers. In the third year she did the same, and in addition had spurs resembling those of a cock. She never bred after this change of plumage, and died the following winter in the hard frost of 1775-6. This specimen was in Sir Ashton Lever's museum, and the trunk, with the atrophied ovary and oviduct, presented by Hunter, is preserved in the museum of the Royal College of Surgeons. In Hunter's account there is a note anticipating objections which will occur to most. It might be supposed, as is observed in this note, that this bird was really a cock which had been substituted for the hen, but the following facts put the point beyond doubt. First, there was no other pied peafowl in the county; secondly, the hen had knobs on her toes, which were the same after the change; thirdly, she was as small after the change as before, therefore too small for a cock; fourthly, she was a favourite bird and was generally fed by the lady and used to come for her food, which she still continued to do after the change in her feathers."—*Penny Cyclopædia*.

We have ourselves seen instances of this change in the fowl, the pheasant, and the peafowl,

and ascertained the diseased condition of the ovary by actual dissection.

Besides the common peafowl, a distinct species, the Javanese or Japan peafowl (*Pavo Japonensis*, Aldrovand.; *Pavo Javanicus*, Horsfield; *Pavo muticus*, Linnæus), is occasionally brought to Europe, and might easily be naturalized. This bird is equal in size to the common peacock, and nearly if not quite as gorgeous in its plumage. It is a native of Java, Sumatra, the Birman Empire, and Japan, and was first noticed by Aldrovandus (1599), not, however, that he had seen the bird itself, but only two drawings of it sent by the Emperor of Japan to the Pope. The figure given by Aldrovandus represents this species as destitute of spurs (but erroneously), and on this mistake arose the term *muticus*, applied to it by Linnæus, who himself had never seen a specimen. Subsequently, Shaw described it in his *Zoological Miscellany*, his authority being a drawing sent from India. In the year 1813, M. Temminck gave, in the second volume of his work on Gallinaceous Birds, a sketch of the head, with a description taken by Le Vaillant, from a living individual which he saw at the Cape of Good Hope, whither it had been sent from Macao. It is the *Japan peacock* of Latham, the *pavo spiciferus* of Vieillot, and the *pavo Aldrovandi* of Wilson. Dr. Horsfield found this species in Java, and Sir Stamford Raffles ascertained its existence in the island of Sumatra. Living individuals have been kept in the gardens of the Zoological Society, and both in the museum of that society and in the British Museum fine specimens are preserved.

Though exquisitely beautiful, the Japanese peacock differs very considerably from its common rival. Its prevailing tints are blue and green, varying in intensity, and mutually changing into each other, according as the light falls more or less directly upon them. The crest is twice as long as it is in *pavo cristatus*, and the feathers of which it is composed are regularly barbed, from the base upwards, in the adult bird, and of equal breadth throughout. Head and crest interchangeably blue and green. The feathers of the neck and breast, unlike those in the ordinary peacock, are broad, short, rounded, and imbricated like the scales of a fish. At their base they are of the same brilliant hue as the head, and have a broad, lighter, and somewhat metallic margin. Those of the back have still more of the metallic lustre. A naked space on the cheeks, including the eyes and ears, is coloured of a light yellow behind, and bluish green towards its fore part. The wing coverts are of the general hue, with a deeper tinge of blue. The primary quill feathers are light chestnut. The tail feathers and their coverts, constituting the train, are of a splendid

metallic brown, changing into green. Their barbs are extremely long, loose, silky, and somewhat decomposed. Their train plumes are almost all terminated by ocellated spots, similar to those which adorn the train of the common species, and of about the same size. In the centre they are of a beautiful deep purple; this is surrounded by a band of green, becoming narrow behind, but widening in front, and filling up a kind of notch that occurs in the blue; then comes a broad brownish band, and lastly a narrow black ring, edged with chestnut, all beautifully metallic, or rather presenting the hues of various precious stones when viewed in certain lights. Bill of a grayish horn colour, rather longer and more slender than in the common species. Iris deep hazel. Legs strong and dusky black. Spurs large.

How far this richly-coloured bird differs in habits and manners while in a state of nature from the common species, we cannot decidedly say. In captivity, however, it has nothing in these points peculiar to itself, but spreads its plumes, and struts about, as if proud of its refulgent attire.

THE GUINEA-FOWL, OR PINTADO.

The Guinea-fowl, or Pintado (*Numida meleagris*), is undoubtedly the *meleagris* of the ancients, though, as we have already stated, this name has been bestowed as a generic appellation upon the turkey. Nevertheless, as a *specific* title, it is applied to the present bird, and is, consequently, used in two senses, with doubtful propriety. Brisson, indeed, has endeavoured to restore the term *meleagris* in a *generic* sense to the Guinea-fowl, but his nomenclature in this point, though correct, has not been adopted, as it would rather lead to confusion than clear up any difficulty.

The genus *Numida* appears to be exclusively confined to Africa—that is, in a state of nature. It is thus characterized:—Bill stout, short, vaulted, and furnished with a warty membrane at the base; from the lower mandible hang two carunculated wattles; head in some species naked, in others feathered; forehead surmounted with a bony casque, in some species with a feathered crest; nostrils pierced in the cere, and divided by a cartilage; tail short; wings concave, the fourth quill the longest; tarsi spurless. Several species, some of great beauty, are known.

The common Guinea-fowl (*Gallina di Numidia* of the Italians, *Poule de Guinée* and *Peintade* of the French, *Pintado* of the Spanish, and *Perlhuhn* of the Germans) is a native of Africa, where it appears to be extensively distributed. It frequents the open glades and borders of forests, the banks of rivers, and other localities where grain, seeds, berries, insects, &c., offer an abundant supply of food. It is gregarious in its habits, associating

in considerable flocks, which wander about during the day, and collect together on the approach of evening. They roost in clusters on the branches of trees or large bushes, ever and anon uttering



THE GUINEA-FOWL.

their harsh grating cry, till they settle fairly for the night. The Guinea-fowl does not trust much to its wings as a means of escape from danger; indeed, it is not without some difficulty that these birds can be forced to take to flight, and then they wing their way only to a short distance, when they alight, and trust to their swiftness of foot. They run with very great celerity, and are shy and wary, and seek refuge amongst the dense underwood, threading the mazes of their covert with wonderful address. The female incubates in some concealed spot on the ground; for the male, as in the case of the turkey, will break the eggs if he discovers them. This habit, unnatural as it may be deemed, appears to be very common among gallinaceous birds. The domestic cock, however, evidently shares in the triumph of the hen, when she has laid her eggs, and answers her peculiar note or cackle of joy.

It cannot be for a moment doubted that the ancient Greeks and Romans were well acquainted with the Guinea-fowl, yet it is not easy to trace out its history. In fact, strange as it may seem, that a bird noticed by Aristotle, Clytus, Pliny, Varro, and Columella, should not ages since have pervaded Europe; it is not until after we received the turkey that the Guinea-fowl became naturalized in Western Europe. Its name does not occur among the list of birds appointed to be served up at the famous feast of Archbishop Neville, in the reign of Edward the Fourth. It does not appear in the Duke of Northumberland's Household Book (1512), nor is it alluded to in the Household Book of Henry the Eighth. Must we not, then, pardon Belon and Aldrovandus for considering the turkey as the *meleagris*, seeing, if

our suspicions be correct, that they did not know the Guinea-fowl. In short, from ancient times, through the middle ages, and to a comparatively recent period, we lose all trace of this bird, and, what is more, we appear to have received it, not from Africa, its native country, but from the Western World, to which, with negroes torn from their homes in Guinea and condemned to slavery, it was transported also. This bird is, indeed, so common in America and several of the West India islands, that some have thought it to be indigenous there; but this is a mistake. In fact, in an old work (*Observ. sur les Cout. de l'Asie*) we are informed that, in the year 1508, or about that time, great numbers of these birds were carried into America by the vessels which traded in slaves; but that the Spaniards, instead of attempting to tame them or render them domestic, turned them at large into the wild Savannahs, where they have increased in such prodigious numbers, that they may well appear to be native. They are seen in vast flocks, and are called by the Spaniards and French *maroon pintades*—*maroon*, or more properly, in modern French, *marron*, meaning fugitive or emancipated.

We may observe that at the present time wild pintados are common in Hayti, and are shot as game; the same observation applies to the island of Jamaica, where they do much injury to the crops.

If, then, in modern days Western Europe received the Guinea-fowl from America or the adjacent islands, how happens it that, living as it did in the vivaria of the Romans, it should not have spread itself over Europe, and been common in our country from early times? We are assured that it has been so. Mr. H. D. Richardson says, "it would be difficult to determine the precise period at which the Guinea-fowl was first brought into Great Britain; its introduction must, at all events, have taken place at a remote date, for we are informed, in Kennet's *Parochial Antiquities*, that it was known in England so early as the year 1277." If this be the case, how happens it that we see no notice taken of it among such birds as *peions* or peacocks, cranes, bustards, and other birds which figured in the feasts of our ancestors, nor even at a later time, when the turkey graced the board? Again, had the Guinea-fowl been common, would Belon and Aldrovandus have ever regarded the turkey as the *meleagris*? However, we will not urge the point.

Though extensively spread, the Guinea-fowl is not even now a very common bird. It is kept in India, but, according to Colonel Sykes, is to be seen only in a domestic state, and is bred almost exclusively by European gentlemen. It thrives, he adds, as well as in its native country.

In England the Guinea-fowl is less generally kept than the turkey, nor do we think it abundant

in France, as far at least as our own observation goes, but it is very easy to be deceived on such a point. We believe that in the colder latitudes of Europe this bird is very rare, and is, in fact, seldom, if ever, to be seen in Sweden, Norway, or Northern Russia. It is not noticed by Linnæus in his *Fauna Suecica*, though he was well acquainted with the species.

Like all the gallinaceous birds, the Guinea-fowl is esteemed for its flesh, and we may add its eggs, which, though smaller than those of the common fowl, are very excellent and numerous, the hen commencing to lay in the month of May, and continuing during the entire summer. Some regard the flesh of this bird as hard and dry, and so indeed that of an old one is, but, after the pheasant season, young birds of the year are by no means unworthy substitutes for that highly prized game. Such birds are acceptable in the London market, and fetch a fair price. Old birds are worth nothing. The Guinea-fowl is of a wild, shy, rambling disposition; in fact, domesticated as it is, it pertinaciously retains its original habits, and is impatient of restraint. It loves to wander along hedgerows, over meadows, through clover or corn fields, and amidst copses and shrubberies; hence these birds require careful watching, for the hens will lay in secret places, and we have personally known them to absent themselves entirely from the farm-yard, until they returned with a young brood around them. So ingeniously (so to speak) have they concealed themselves and their nest, so cautiously have they left it and returned to it, as to elude the searching glance of boys well used to bird-nesting. There is one disadvantage in this, namely, that the bird will often sit at a late period of the year, and bring forth her brood when the season begins to be too cold for the tender chickens; besides which, a great portion of her eggs will be lost. The best plan is to contrive that the hens shall lay in a quiet secluded place, and to give about twenty of the earliest eggs to a common hen ready to receive them, and who will perform the duties of incubation with steadiness. In this way a brood in June may be easily obtained. The young must receive the same treatment as those of the turkey; they require a mixture of boiled vegetables, with curds, farinaceous food, as grits, barley-meal, &c.; in a short time they begin to search for insects and their larvæ, and with a little addition to such fare as this, and what vegetable matters they pick up, will keep themselves in good *game-condition*, without cramming or overfeeding; for a week or two before being killed for the table they should have a liberal allowance of grain.

The period of incubation is twenty-six days. One male may be established as the lord of twelve or fifteen females. Though the Guinea-fowl is

not an unprofitable bird, seeing that it is capable of procuring almost entirely its own living, still it is rejected by many on account both of its wandering habits, which give trouble, and its disagreeable voice, resembling the noise of a wheel turning on an ungreased axletree, and which is perpetually uttered; beside, the males are pugnacious, and, though spurless, are capable of inflicting considerable injury on other poultry with their stout hard beaks.

Like their wild progenitors, domestic Guinea-fowls prefer roosting in the open air to entering under the roof of a fowl-house; they generally choose the lower branches of some tree, or those of large thick bushes, and there congregate together in close array; before going to roost they utter frequent calls to each other, and when one mounts up the others follow in rotation; they retire early, before the common fowl or the peafowl. We have said that Guinea-fowls choose the lower branches of trees and bushes, and we speak from our own observation. Markwick, in his additions to White's *History of Selborne*, on the contrary, says, "Guinea-fowls not only roost on high, but in hard weather resort, even in the day-time, to the very tops of the highest trees. Last winter, when the ground was covered with snow, I discovered all my Guinea-fowls, in the middle of the day, sitting on the highest boughs of some very tall elms, chattering and making a great clamour. I ordered them to be driven down lest they should be frozen to death in so elevated a situation; but this was not effected without much difficulty, they being very unwilling to quit their lofty abode, notwithstanding one of them had its feet so much frozen, that we were obliged to kill it. I know not how to account for this, unless it was occasioned by their aversion to the snow on the ground, they being birds that came originally from a hot climate."

Though the Guinea-fowl is perhaps less calculated to endure our winters than the turkey, yet we think that, with the same attention bestowed upon it as upon the pheasant, it might be naturalized as *game* in our woods and large preserves; but whether the experiment is worth undertaking, is another question.

The loud reiterated cry of the Guinea-fowl, and the sonorous scream of the peacock, are said to be indicative of an approaching change of weather. This is very probable, but we have not ourselves verified the general opinion. Though the Guinea-fowl seems a tolerably large bird, it is not so in reality; its loose full plumage makes it appear larger than it is—it does not, when plucked, weigh more than a common fowl, if of fair size and in good condition. It is a beautiful bird, but too well known to require any detailed description. The male and the female very much resemble each other; the male, however, has the casque higher, and the

wattles are of a bluish red; the wattles in the female are smaller, and red. The eggs are of a dusky white, minutely sprinkled with rusty brown.

FAMILY CRACIDÆ, OR THE CURASSOWS.

The Curassows (*cracidæ*), though belonging to the gallinaceous order, depart in some respects from the typical characters of the birds of this important section. The hind toe is not elevated on the shank or *tarsus*, but is rather long and touches the ground throughout its whole length, the head is fully feathered, generally crested, and there is often an extensive cere or naked skin at the base of the beak; sometimes the head is crowned with a horny casque or helmet, the bill is generally stout and vaulted, the trachea, in most species, forms loops or curvatures in front of the sternum before entering within the cavity of the chest. All the species (constituting several genera) are natives of Mexico and South America.

It may be deemed wrong in us to enumerate the curassows among our domestic poultry, and indeed our great object here is to draw attention to them as most valuable additions to our feathered stock. They are not only readily susceptible of domestication, but they have been domesticated, and on this ground we claim, for certain species at least, a place in the present work. These birds are of considerable size, and their flesh is exquisitely white and delicate.

Various species have been kept from time to time in the menagerie of the Zoological Society, and it must be confessed without the accomplishment of the chief object in view, namely their naturalization, but it is not often that in a menagerie such an object is attained; sufficient attention cannot be given to them, there are too many objects to which care and time have to be devoted, to render it possible for keepers and their assistants to conduct experiments with such an end in view. Besides, the birds are kept in too strict confinement, and on cold flagged floors, often flooded with water, producing general ill health, if not positive disease. We have seen curassows with their toes lost from the effects of cold and wet; it should be remembered that they are *arboreal* in their habits, and natives of the forest of a hot climate, and consequently should be accommodated as far as possible in a manner consistent with their habits and requirements. Mr. Bennett, in his work on the Gardens and Menagerie of the Zoological Society of London, published some years since, drew attention to these birds, and in 1837 one of the six medals offered as premiums by the Zoological Society was to the breeder of the greatest number of curassows for that year. No claimant, however, made good his title to the prize. It was a work respecting which many were anxious, but few able

to give directions. "Of all the gallinaceous birds in the collection," says Mr. Bennett, "the most interesting are those which hold out to us a prospect of supplying our farm-yards with new breeds of poultry of a superior kind. Such are especially the curassows. In many parts of South America these birds have long been reclaimed, and it is really surprising, considering the extreme familiarity of their manners, and the facility with which they appear to pass from a state of nature to the tameness of domestic fowls, that they have not yet been introduced into the poultry yards of Europe. That with proper treatment they would speedily become habituated to the climate, we have no reason to doubt; on the contrary, numerous examples show us that they thrive well even in its most northern parts, and M. Temminck informs us that they have once at least been thoroughly acclimated in Holland, where they were as prolific in their domesticated state as any of our common poultry. The establishment, however, in which it had been effected was broken up by the civil commotions which followed in the train of the French Revolution, and all the pains which had been bestowed on these birds were lost to the world by their sudden and complete dispersion. The task, which had at that time been in some measure accomplished, still remains to be performed; and it may not be too much to expect that the Zoological Society may be successful in effecting what was then begun, and in naturalizing the curassows as completely as our ancestors have done the equally exotic, and, in their wild state, much less familiar breeds of the turkey, the Guinea-fowl, and the peacock. Their introduction would certainly be most desirable, not merely on account of their size and beauty, but also for the whiteness and excellence of their flesh, which is said by those who have eaten it to surpass that of the Guinea-fowl or the pheasant in the delicacy of its flavour."

For ourselves we think that private individuals with moderate means at command, and bent upon the accomplishment of the desirable object of naturalizing these birds, would be far more successful than any institution or society, more especially in some of our southern counties, as Surrey, Sussex, Hampshire, and Kent. The birds should be kept in a large dry yard or netted enclosure, with a grass-plot and water in it; there should be two or three trees of moderate elevation, or in lieu thereof artificial trees made of branches, to which the birds should have free access; to this should be attached a good high barn, perfectly weather-tight, with perches at some distance overhead; to this barn they must be induced to resort every evening, which may be done by giving them their evening meal there, and then closing the door. There should be a window or two in the walls, well

secured by netting, in order to give them sufficient light; boxes placed at the ends of the perches, or in such situations as are in accordance with their instincts, should be provided for the hens to lay in, and be lined with straw and dried leaves. Should the hens exhibit no disposition to incubate, the eggs may be placed under a common fowl. The food and general treatment should assimilate to what is recommended in the case of the turkey. We give general directions only; the successful cultivator of these birds will have many things to learn from experience, but his knowledge of their habits in a state of nature will be a very safe and efficient guide to him. He must remember that the curassows are arboreal in their habits, far more so than either the peafowl, the turkey, or the Guinea-fowl; that most, though not all, make their large rude nests on the topmost branches of tall trees, and that the young, as we believe, are not in so forward a state, on their exit from the egg, as the young of the ground-breeding *gallinaceæ*.

It is not our object to describe every species of curassow, but to select from among them such only as are most likely to become readily naturalized; those, in fact, which for this purpose have been already introduced into the vivaria of England and the Continent, and in the management of which M. Ameshoff in Holland was so successful.

1. The GALEATED CURASSOW (*Ourax pauri*, Cuv.) In the genus *ourax* the bill is short, stout,



GALEATED CURASSOW.

compressed laterally, and vaulted above; the base of the upper mandible is dilated into a sort of helmet rising over the top of the head. This protuberance, however, is not visible in young birds till after the first moulting, when it appears as a small tubercle; it is much larger in the adult males than the females, and in the former attains the height of two inches; externally it is hard and bony, internally it is cellular and communicates with the back of the mouth. The nostrils (at least in this species) are placed behind the pro-

tubercle in a membranous cere covered with short velvety feathers, the head is covered with short and closely set feathers, tarsi long, tail composed of fourteen stiff pens.

The galeated curassow equals a hen turkey in size; it is a native of the forests of Mexico, where it lives in large flocks, which frequent the branches of tallest trees. It is said, however, to make its nest generally on the ground, a circumstance the more favourable for its naturalization as a domestic bird. The young are led about by the female, following her exactly in the same way as the chickens of the ordinary fowl, or of the pheasant or partridge, follow their respective mothers, obedient to her call. At first the young feed principally on insects and their larvæ, such as those of ants, &c., which are everywhere abundant; by degrees they begin to feed on various seeds and fruits, much in the same way as does the young of the turkey, which bird, in many of its general habits, this species appears to resemble.

The galeated curassow, with the exception of the abdominal region, under tail coverts, and extreme tip of the tail, which are white, is of a rich glossy black, with a tinge of green exhibiting itself in certain lights; the helmet is slate coloured, the tarsi are red, the claws yellow, the bill is bright red, the iris brown. The trachea or wind-pipe sweeps down for a considerable distance under the skin of the breast, making three loops or convolutions before it passes into the cavity of the chest. In an allied species (*ourax mitu*, Cuv.) the course of the trachea before it turns into the chest is very protracted (see Yarrell in *Proceeds. Zool. Soc.*, 1830-1, part i.)

In captivity the galeated curassow is gentle and familiar, and we have no hesitation, from our own experience, in asserting that if once naturalized (and we regret that we are so situated as to render the attempt impracticable on our own part), this beautiful bird would be as tame and confiding as any pet fowls in a farm-yard, but we are sorry to say that we have never seen a chance given to it of displaying itself in its truly reclaimed condition. In this opinion relative to its docility we are confirmed by M. Temminck, who informs us that it was one of the species not only the most easily domesticated, but which bred the most freely, in the menagerie of M. Ameshoff, before the lamentable disasters subsequent to the French revolution—we mean that of 1793.

As we have intimated, other species belong to the genus *ourax*, but the species here described is the most common in our menageries, and therefore the most likely to attract the notice of a patriotic cultivator of our feathered dependents.

2. The CRESTED CURASSOW (*Crax alector*, Linn.)

—In the genus *crax*, the bill is moderate in length,

compressed, deep at the base, carinated above and curved towards the tip; it is encircled by a basal cere pierced by longitudinal nostrils, which are partially covered. Lore naked; head crested with curled feathers; tail ample and spread out, consisting of fourteen pens.

The crested curassow equals, or rather excels, the preceding species in size, and is a very graceful and noble bird; it is a native of Mexico, Guiana, and Brazil, and in fact appears to have an extensive range over the warmer regions of the American continent. It abounds to such an extent in the woods of Guiana, that M. Sonnini regards it as one of the surest sources of supply on which a



THE CRESTED CURASSOW.

traveller penetrating the vast forests of that region, with his gun only, to which he must look for subsistence, may place his reliance. This bird congregates in numerous flocks, which are in general little disturbed by the intrusion of man into their haunts; indeed, so unsuspecting are they that when their ranks have been thinned by the fowling piece or rifle, the rest have remained quietly perched upon the trees, as if unconscious of the havoc committed amongst them. In the neighbourhood of inhabited places, however, where their proximity to man, who is their most active persecutor, has taught them to fear him, they are far more wild, cautious, and distrustful, and recede deeper into the recesses of the wood on the approach of the hunter, who nevertheless destroys them in great numbers. They build large rude nests on the branches of trees, constructing them of twigs and sticks interlaced with stalks of herbaceous plants, and lining them with a bed of dried leaves and grass. Their period of incubation is said to be during the rainy season. According to Azara, the female lays eight eggs (Sonnini says five or six), nearly as large as those of a turkey, but white and thick-shelled.

In captivity the crested curassow is gentle and

familiar, and, according to M. Ameshoff's experience in his vivarium, may be domesticated with very little trouble. The galeated curassow is a fine bird, but we think this species to be altogether more graceful; its beautiful forward-curved crest is an elegant ornament; it consists of velvety feathers from two to three inches in length, and is capable of being raised or depressed at pleasure. The eyes are surrounded by a naked skin, which extends to the cere, and there assumes a bright yellow colour. The general plumage is of a deep black with a slight metallic gloss of green, the abdominal region being of a dull white.

There are other species included in the genus *crax*, of which we shall mention only one, the red-knobbed curassow (*crax Yarellii*), described from a species which died in the menagerie of the Zoological Society; in general characters it agrees with *crax globicera*, Linn. For an account of the structure of the trachea in this species we refer to the *Proceedings of the Zool. Soc.*, for February, 1831.

In passing over some species without definite notice we may perhaps, in the eyes of a few, commit an egregious error; but our object is not to give a monograph on the *cracidæ*, which would be a work in itself of some magnitude, but to indicate from among the numerous species those which, from our personal acquaintance with them in a living state, we can conscientiously recommend as most fitted for the experiment of domestication. Other species, we doubt not, are equal to the two we have already mentioned, but they are rarer, and what is more, have never been subjected to any test. To theorize upon the origin of domestic animals, and to give plain directions consonant with our own experience, are two different things. Were we to attempt the naturalization of any curassows (and our will is good), we should select the two previously noticed, not, however, to the exclusion of another, which, though not called a curassow, has little to distinguish it from birds bearing that name, and to which it is indeed immediately related. We shall therefore include it in our list.

3. The GUAN (*Penelope cristata*, Gmelin).—The generic characters of *Penelope* are thus detailed by systematic ornithologists:—Bill moderate, naked at the base, convex and high, bent at the point; lore and base of the bill naked; under the throat a naked wattle-like skin, which is capable of being inflated or swollen; nostrils pierced in the cere, towards the middle of the bill half closed; tarsi long and slender; tail-feathers twelve.

The guans are of more rare occurrence in our menageries or vivaria than the curassows; we have, however, very frequently observed the present species—the crested guan—and can affirm that it is in all respects as fitted for naturalization as

either of the preceding; indeed it has been domesticated in Holland, and therefore might be so in our country, though perhaps less profitably, as it appears that though these birds associate in flocks, they pair like the pigeon or the partridge. Perhaps their introduction as game might be the most advisable.

We are told by M. Temminck that the proprietor of a menagerie near Utrecht had bred the crested guan for several years; hence, as Mr. Bennett observes, "there can be little doubt that with proper care and attention these birds might be added to the stock of our domesticated fowls. They are spoken of as furnishing an excellent dish for the table. In a wild state they inhabit Guiana and Brazil, and perhaps extend still farther to the north. Their food consists principally of seeds and fruits, which they search for upon the ground, but the greater part of their existence is passed upon the trees, on the tops of which they perch, and in which they build their nests. They are often found in large bands, but generally pair together with the strictest constancy. The females lay from two to five eggs. Their flight, like that of most gallinaceous birds, in consequence of the shortness of their wings, is low and heavy, and in the performance of this action they derive much assistance from their tail, the feathers of which may be expanded in the shape of a fan. All the birds of this genus appear to be known in Brazil by the name of *jacu*, pronounced *yacou*, derived, according to Marcgrave, from their note. This, as might be expected from the conformation of their trachea, is extremely loud, insomuch that when a considerable number are collected near the same spot, the very woods, to use the expression of the scientific traveller (Marcgrave), re-echo with their clamorous cries." This species has been long domesticated in the poultry-yards of South America, and, as may be supposed, is subject to some slight variation in plumage; hence has arisen a difficulty as to the elucidation of species, and to this perplexity M. Spix has not a little added, by giving in his *Brazilian Birds* a series of figures representing several so-called species, differing in trifling points of marking from the common form. We believe with Mr. Bennett that most of these will ultimately be found to be referable to the present species. At the same time we confess that an elucidation of the species of this genus, and indeed of the *cracidæ* altogether, is yet a desideratum.

The crested guan (*Penelope cristata*) may be thus described:—The upper parts generally are dusky black, or rather of a bronzed black glossed with green, changing in certain lights into metallic olive; from the under part of the bill proceeds a black stripe, which surrounds the ear; the bill is blackish, the cheeks are naked and of a violet

purple; the feathers on the top of the head are long, forming a thick tuft or crest, which the bird can raise or depress at pleasure; the naked part of the throat is scarlet, with a contractile and extensile fold of depending skin, assuming the appearance of a large wattle; the fore part of the neck and chest are spotted with whitish, each feather being bordered by this colour; lower part of the back, abdomen, and thighs, reddish or red-brown; the trachea is looped under the skin of the breast before proceeding to enter the thoracic cavity—but for minute details on this anatomical point, we refer to Mr. Yarrell's paper in the *Proceedings of the Zool. Soc.* for 1833.

The female in this species of guan differs from the male in external characters, principally in having her plumage, that of the under parts more especially, tinged with red. Length about thirty inches, of which the tail feathers are thirteen. Size that of a large hen turkey.

Several other species of guans (*Penelope*) are described, as *P. Aburri*, inhabiting the mountains of New Grenada, *P. Parrakona* and *P. Pavita*; but of these we have no practical knowledge—that is to say, as living in our vivaria. They are described as being arboreal and solitary, uttering loud cries on the close of day and early in the morning, and rarely visiting the ground.

In looking over some notes relative to the curassows, which we have ourselves studied at the

gardens of the Zoological Society, we find that we may add to our list the globose curassow (*crax globicera*), locality, Guiana and Brazil; and Yarrell's curassow (*crax Yarrellii*, Bennett), also from Guiana—familiar birds, but which are not frequently introduced into Europe. There is, however, one species, the red curassow (*crax rubra*), worth particular notice—a beautiful bird, which is a native of Peru and Mexico. It is kept in a domesticated state in the warm parts of America and some of the West India islands. This species is subject to much variety of plumage, and, as it is asserted, it interbreeds when tame with other species of the genus, producing various cross-breeds. Such varieties, said to be between the red curassow and the crested curassow, we have ourselves seen—bred, moreover, in England. This species is the *hocco de Péru* of Buffon, *hocco* being the French name for these birds in general.

There are other genera belonging to the family *cracidae*, as *ortalida*, *opisthocomus*, &c., but of these we can select no species which has claim to notice in such a work as this. At the same time, we cannot help observing that some of the species, as the ortalide (*ortalida motmot*, *phasianus motmot*, Gmelin) and others, might be introduced as valuable game into our woods and forests. In talking about the introduction of new game, we know that we are touching a dangerous point; but we are writing merely as a naturalist.

CHAPTER V.

THE COLUMBINE ORDER.

ORDER, *Columbæ*, Gray; *Sponsiores*, De Blainville; *Gyrantes*, Bonaparte; *Gyratores*, Nobis.—From this order—for an order it undoubtedly is, with doubtful alliances—one species only (we except the collared turtle-dove, *columba risoria*, kept in aviaries) is known as a domestic bird. We allude to the common pigeon and its many varieties, the result of culture.

The columbine order includes many families, and of these some approach the gallinaceous birds in many of their habits and characteristics. Such, for example, are the *columbi-gallines* of Le Vaillant, the wattled pigeon (*geophilus carunculatus*) of South Africa, the Nicobar pigeon (*columba? Nicobarica*, Latham), and the crowned pigeons (gen. *lophyrus*), exceeding the common fowl in size, and of which two species have been kept alive in the menagerie of the Zoological Society. Others, on the contrary, depart widely from the gallinaceous type, and yet, in our opinion, do not approach any of the passerine forms in essential particulars. We do not mean to say that there are no points of agreement,

but that these are common points, and therefore no indications of close alliance.

There is no part of the globe, setting aside the high boreal regions, destitute of birds of this order; but the species are most numerous in the warmer latitudes. Australia, New Zealand, the islands of the Indian Archipelago, and many in the Southern Ocean, present us with species of pre-eminent beauty. Some, as we have intimated, are, like gallinaceous birds, almost exclusively terrestrial in their habits; others are exclusively arboreal, making their home in the depth of the woods; while a few are rupestral, haunting craggy precipices and steep abrupt cliffs, in the fissures and on the ledges of which they place their rude nests, and rear their young. Such are the habits of the *columba livia* or *rock-dove*, the parent of our domestic varieties.

It is not here our purpose to enter into an analytical investigation of the various groups into which the columbine order may be subdivided; nevertheless, a cursory survey of the distinctive

characteristics of the *true or typical pigeons* is within the scope of our present subject.

The passerine birds, like the sparrow, linnet, lark, or redbreast, as examples, pair in the spring. The female rears one or two broods, sometimes three, during the season. The eggs are generally five, in some instances many more. The young are hatched helpless and unfledged, and are fed by the parents, who both unite in the care of the young, and generally in the duty of incubation. Gallinaceous birds, on the contrary, with certain exceptions, as the partridge, are polygamous. The females lay numerous eggs. The young are hatched in so forward a state of development as to be able, in the course of a few hours, to run about and feed themselves. They remain under the care of the female only, the male taking no interest in them.

Pigeons pair, and it would appear that the union continues during life, which is not the case among the passerine tribes. Both male and female engage in the construction of the nest, and relieve each other in the task of incubation. Two eggs only are laid, and the young are hatched blind, naked, and helpless, and sedulously fed and cherished by both parents. Several pairs of young are reared during the season. The young are fed for some days after exclusion from the egg, not on pulse or grain, or insects, but upon a peculiar lacteous secretion which is poured out from a series of glands in the crop both of the male and female, these glands developing themselves into activity by a mysterious law at the proper juncture. This lacteous fluid is very abundant, and, as we have often seen, will frequently drip from the bills of the pigeons as they approach towards their young. It is thrown into the open mouths of the nestlings by a kind of exurgitation, the receiving one and the giver being both in agitation. In the course of a few days, pulse or grain, moistened in the crops of the parents, and mixed with this lacteous curdy fluid, is given, the secretion gradually decreasing as it is less and less required, till at length peas, moistened or macerated in the crop, are alone transferred into that of the young.

Previously to the time in which this lacteous secretion is needed, the crop of the pigeon is thin and membranous; but as the incubation approaches to a close, the membranes of the crop become thickened and very vascular, and the inner lining has a corrugated and glandular appearance. The lacteous secretion now begins to flow abundantly, precipitating a curd-like matter, which, mixed with the fluid, is transferred from the crop of the parent to that of the young. About the third day, some of the ordinary food after maceration in the crop is added, its proportion being increased, till at length, when the young quit the nest, it constitutes their food entirely.

We need not say that nothing like this lacteous secretion is produced for the support of the young in the crops of any species of the gallinaceous order; yet in many other birds the secretion of a fluid from the lining membrane of the crop takes place while they are rearing their young, and is mixed with the food which they transfer into the crop of the latter. In fact, it is more general among the finches than naturalists have suspected, and is also common to the parrot tribe. This circumstance did not escape the observant eye of the celebrated John Hunter. "Besides the dove kind," he writes, "I have some reason to suppose parrots to be endowed with the same faculty, as they have the power of throwing up the contents of the crop and feeding one another. I have seen the cock parrot regularly feed the hen, by filling his own crop, and then supplying her from his beak. Parrots, macaws, cockatoos, &c., when they are very fond of the person who feeds them, may likewise be observed to have the action of throwing up the food, and often do it. The cock pigeon, when he caresses the hen, performs the same kind of action as when he feeds his young; but I do not know if at this time he throws up anything from the crop." This latter doubt we can answer. He does not throw up a milky secretion, but often the macerated peas or beans on which he is fed. We may add, that we have never observed this action of regurgitation in the gray parrot, nor in any of the large green parrots from South America. The honey-eating paroquets of Australia feed their young with the nectar of flowers, with which they have filled their crop, but we do not know whether any peculiar secretion be added to it or not.

So far, then, it would appear that the pigeons have peculiarities in which they differ most decidedly from the gallinaceous order on the one hand, and the passerine order on the other; and yet to both these orders have different naturalists assigned them, according to their respective theories. A few other points peculiar to the columbine order have yet to be noticed. None of the pigeons can be said to be true perching birds. Some, indeed, are decidedly terrestrial, but even those whose habits are arboreal may be said rather to rest upon the larger boughs than to adhere to their perch by a firm grasp. Their tarsi and toes resemble neither those of gallinaceous birds nor those of the passerine tribes generally. The tarsi are mostly short and thick, as are the toes also, which latter are furnished with blunt feeble claws. The tarsi are covered in front with broad imbricated scales. The hind toe, even in the most terrestrial species, is not placed high on the tarsus, as in the fowl, but on the same plane with the others, and in walking is fairly pressed to the ground. In this character the pigeons agree with

the curassows. The form of the bill in the pigeons is peculiar. It is moderate in size, compressed laterally, more or less elevated and curved at the point, and covered at the base of the upper mandible with a soft swelling skin, in which the nostrils are pierced. The general plumage is full, closely arranged, but composed of soft feathers slightly adherent to the skin. The wings are long and pointed, the quill feathers firm, the pectoral muscles voluminous, and the powers of flight at a high ratio. However, there are exceptions. In the crowned pigeons of the Moluccas and New Guinea (gen. *lophyrus*) the wings are rounded and concave, and the powers of flight reduced. The tarsi, moreover, are covered with rounded scales.

The voice of the pigeon is a deep, hoarse, or guttural cooing, uttered principally by the male, as the language of endearment to his mate—

"Nec gemere aëriā cessabit turtur ab ulmo."

While uttering this *gemitus*, the crop swells out, being inflated with air from the lungs, and the bird struts about, alternately raising and lowering his head.

Pigeons drink differently to most other birds. Gallinaceous birds sip, and raise up their heads; but pigeons take a long-continued draught, as Gilbert White says, like quadrupeds. So far we have sketched out generalities, nor shall we here attempt more. To enter into the details of families and genera would be foreign to our main purpose. We here merely desire to place the columbine order in its correct light, as we think, before an intelligent reader.



ROCK-DOVE.

We have already intimated that the rock-dove (*Columba livia*) is the origin of all our domestic pigeons. This is a British bird, but is most widely diffused, not only over Europe, but over Asia and Africa. Everywhere it haunts rocks, precipices, and caverns along the shore; towers,

cathedrals, and high buildings. We have seen numbers about Canterbury Cathedral; and even in London wild blue pigeons make their nests in the crevices and on the ledges of several of our public edifices, though perhaps these may be *feral*—that is, emancipated and returned to a state of nature—or partly intermixed with true wild birds. They must fly far abroad for food, and in winter, perhaps, trust to green vegetables and what they can pick up in the fallow fields, together with haws, the fruit of the dog-rose, and the seeds of wild plants. These birds swarm along the cliffs bordering the sea of Spain, Italy, France, and North Africa. Myriads tenant the recesses or caves of the rock of Gibraltar and the rock of Teneriffe. In India this species congregates in vast flocks, and is a constant inhabitant of every dilapidated building. According to Colonel Sykes, it is the *parva* of the Mahrattas; but this able observer confounds it with the stock-dove (*Columbaenas*), an arboreal species, which (having examined the specimens) we unhesitatingly venture to correct. In Britain, says Mr. Selby, it is found in various cliffs along the wide extent of our shores, as those of Caddy Island in South Wales. It is a never-failing resident in the wild precipices of the Orkneys, breeding in the caves, which are there numerous and of large dimensions, and where, according to Low, it retires to the inmost recesses, beyond the situations chosen for incubation by the auks, gulls, and other aquatic fowls. It also inhabits the caves in the cliff at St. Abb's Head, on the Berwickshire coast, in considerable numbers, as well as those in the isle of Bass in the Firth of Forth.

The habits of this bird are eloquently described by Virgil in one of his apt similes (*Æneid*, lib. v.):—

"Qualis speluncā subito commota columba
Cui domus, et dulces latebrosi in pumice nidi
Fertur in arva volans, plausumque, exterrita, pennis
Dat tecto ingentem, mox aëre lapsa quieto
Radit iter liquidum, celeres neque commovet alas."

which we may thus translate:—

"Like as the dove, suddenly disturbed in her cavern,
Whose nesting-place and darling young are in the obscurity of
the rock,
Dashes forth abroad, and affrighted clashes her wings,
Resounding in the cave, then gliding into the still air,
Skims the liquid way, nor moves her rapid pinions."

This description is so characteristic, that it deserves the notice of the ornithologist; but we have seen no poetical translation which pleases us; and, indeed, we ought to apologize for the feebleness of our literal version. In all times true poets have been observers of nature, but zoologists in general have overlooked their passing descriptions.

Having thus introduced the rock-dove or

Columba livia to our reader, a few words tending to throw light in a popular manner upon the British *columba* may clear up all difficulties. We may premise by stating, that the ring-necked turtle-dove, so often kept in cages and aviaries, is not a British bird. It is a native of Africa and Asia. It is common in India, in Egypt, and in Africa from north to south. It is the "turtle" of the Scriptures, and was probably the *τρυγών* of the Greeks.

1. The COMMON TURTLE-DOVE (*Turtur auritus*, Ray; *Columba turtur*, Linn.)—This elegant bird is a summer visitant to our island, arriving about the beginning of May and departing early in September. It is seldom to be met with in the northern or western counties, but is common in Essex, Kent, Surrey, Sussex, Middlesex, &c., where it breeds in the thickest woods, and may sometimes be seen in small flocks frequenting the pea-fields as soon as the crop begins to ripen. It is strictly monogamous, building a flat rude nest of twigs in the embowerment of dense foliage. The eggs are two, and of a white colour, about half as large as those of the common pigeon. This bird is spread over the whole of the southern and temperate parts of Europe. Its food consists of seeds, grain, berries, &c.

2. The RING-DOVE, CUSHAT, or QUEST (*Columba palumbus*, Linn.)—The ring-dove, or *ramier* of the French, is a sedentary bird in the warmer and temperate portions of Europe, but migratory in colder latitudes. It is our largest British species of pigeon, and is a permanent resident. It frequents woods and large groves, breeding early in the spring, and producing about three broods in the course of the season. It builds a flat nest of sticks and twigs in the fork of a branch, and often in fir trees or amidst masses of clustering ivy. After the breeding season, these birds assemble in flocks, and visit fields of peas or beans, and stubble fields; acorns and beach-mast are also in great request. As the winter advances, berries and green vegetables, such as turnip tops, &c., constitute their food. With respect to green vegetables as food for graminivorous birds, the present included, Gilbert White says:—"One of my neighbours shot a ring-dove on an evening as it was returning from feed and going to roost. When his wife had picked and drawn it, she found its craw stuffed with the most nice and tender tops of turnips. These she washed and boiled, and so sat down to a choice and delicate plate of greens, culled and provided in this extraordinary manner. Hence we may see that graminivorous birds, when grain fails, can subsist on the leaves of vegetables. There is reason to suppose that they would not long be healthy without them; for turkeys, though corn-fed, delight in a variety of plants, such as cabbage, let-

tuce, endive, &c., and poultry pick much grass, while geese live for months on commons by grazing alone." To this Markwick (*Notes upon White*) adds, "That many graminivorous birds feed also on the herbage or leaves of plants, there can be no doubt. Partridges and larks frequently feed on the green leaves of turnips, which gives a peculiar flavour to their flesh that is to me very palatable." Mr. Selby, however, says that the flesh of the ring-dove, excellent as it is while the bird feeds on grain, is strong and unpalatable after a diet on turnip-tops, rape, and other cruciform plants. This fine pigeon is too well known to require description.

3. The STOCK-DOVE (*Columba oenas*).—The stock-dove (*La columbin, ou petit ramier* of the French) has been erroneously regarded as the stock whence has descended our common pigeons; but this is an error. The stock-dove is arboreal in its habits, and is principally confined to our midland counties, where it is a permanent resident, breeding in woods, its rude nest being often placed on the top or in the hollow of some aged pollard tree. In its habits it precisely agrees with the ring-dove, and it feeds on the same food. As this bird and the *Columba livia* have been confounded, and as this bird has been supposed to be the origin of our domestic race, we give the following description of it from Selby:—Head and throat deep bluish gray; sides of the neck glossed with different shades of green and purple; the feathers shorter, more distinct, and stiffer than those of the rock-dove; lower parts of the neck and breast pale lavender purple; belly, thighs, and under tail coverts bluish gray, with a slight purplish tinge; back deep bluish gray; wing coverts paler, and some of the greater ones spotted and barred with black, but not forming any defined bar as in *Columba livia*; quills blackish gray, the outer webs near the base of the feathers passing into bluish gray; lower part of the back bluish gray; tail of the same colour, with a broad black bar at the end, and having the outermost feather margined with white; wings, when closed, reaching to about half the length of the tail; irides brownish red; legs and toes bright cochineal red.

4. The ROCK-DOVE (*Columba livia*).—This non-arboreal rock and tower haunting bird (*Le biset* of the French) approaches in plumage to the foregoing species, from which, however, it is most decidedly distinct. The following characters will serve to mark it:—Bill blackish brown; irides pale reddish orange; greater coverts and secondaries barred with black, and forming two broad and distinct bands across the closed wings; lower part of the back white; wings, when closed, reaching to within half an inch of the end of the tail; legs pale purplish red. In size the two

species nearly agree, but the rock-dove is more slender. It is, then, from this bird that our domestic pigeon claims descent; and although Gilbert White entertained some indefinite ideas respecting the stock-dove, the mode of nidification of which he was unacquainted with, he clearly discriminated between the species, and in a letter to Pennant (XCIV.) thus expresses himself:—"I readily concur with you in supposing that house-doves are derived from the small blue rock pigeon for many reasons. In the first place, the wild stock-dove is manifestly larger than the common house-dove, against the usual rule of domestication, which generally enlarges the breed. Again, those two remarkable black spots on the remiges of each wing of the stock-dove, which are so characteristic of the species, would not, one should think, be totally lost by its being reclaimed, but would often break out among its descendants. But what is worth a hundred arguments is the instance you give in Sir Roger Mostyn's house-doves in Caernarvonshire, which, though tempted by plenty of food and gentle treatment, can never be prevailed on to inhabit their cot for any time, but, as soon as they begin to breed, betake themselves to the fastnesses of Orm's-head, and deposit their young in safety, amidst the inaccessible caverns and precipices of that stupendous promontory."

We know a church tower in Worcestershire within which, in our younger days, scores of emancipated pigeons bred. They obtained their own living, and the clerk, who kept the keys of the the church, availed himself of the young for his table. This could not be called robbing the church—the pigeons only paid their tithe for occupancy.

The rock-dove feeds on grain and seeds of various kinds, as well as on vegetables. According to Montagu, it also devours some kinds of snail, and is especially fond of the *helix virgata*; but this we cannot assert from our own knowledge. It breeds about three times in the season.

It is evident that from a very remote period the pigeon has been domesticated in the East, and thence, we suspect, has gradually spread over Europe, at least as far as some of its varieties are concerned, such as the carrier, the barb, and others. To reclaim the pigeon up to a certain point is by no means difficult; in fact, dove-house pigeons, kept in large flocks for the supply of the markets with the young during the season, are rather *familiarized* than *reclaimed*—they retain much of their wild nature, and, generally speaking, so closely resemble the rock-dove in appearance as to render it difficult to distinguish between them; they are usually of a leaden blue, barred on the wings, and white on the lower part of the back. Such also is the character of the pigeons kept in the dove-towers of Persia; amidst the vast flocks

of which a white pigeon is so rarely to be seen as to be regarded as a sort of prodigy.

Though fancy pigeons are kept for the sake of their beauty and peculiarities, the ordinary dove-house pigeon is reared almost exclusively for the sake of its flesh, which is accounted in most countries a delicacy. But how far the rearing of great numbers of these birds is profitable in our country may admit of question; the quantity of gray peas, beans, and grain, which even a small flock will annually consume, is enormous. What, then, must be the consumption of flocks of many hundreds? We cannot give any certain statistical details, but, turning to M'Culloch's *Account of the British Empire*, we find (vol. i., p. 500) the following observations:—"Pigeons. There are great numbers of these birds in England. A dove-cot is reckoned an indispensable adjunct to a country gentleman's residence, and in many counties it is customary for farmers to keep a few pairs. They are occasionally reared in the view of supplying the market, but for the most part they are kept as articles of luxury. They are very voracious, and destroy great quantities of grain. There are some rather curious speculations on this subject in Vancouver's *Survey of Devon*. He supposes that there are in all 20,000 pigeon-houses and 1,125,000 pairs of dove-house pigeons in England and Wales, and that they consume 157,500,000 pints, or 4,921,875 Winchester bushels of grain a-year! Of course there must be a good deal of looseness in this statement; it has been said by some to be much under, and by others to be much over the mark. But, without giving any opinion on this point, there can at all events be no question that the number of pigeons is very great, and that the destruction they carry on, when considered in the aggregate, must be very considerable indeed."

Young pigeons sell in the market for about a shilling per couple—the breeder, of course, sells them for much less; each pair will rear four pairs of young in the season. Will the price obtained for these four pairs remunerate the breeder for the keep of a pair of adult birds throughout the year? We much doubt it; however, we will not be positive, for in some districts these birds may be kept at far less expense than in others. In the markets in France pigeons are abundant and very fine, and in some parts of that country we have seen them in enormous flocks scattered over the fields gleaning for themselves; but in spring, and again throughout the winter, they must require more food than they can collect by ranging the country. It is principally from France that the London markets derive their supply.

In Western Asia, Syria, and Egypt, pigeons in modern days, as in times of antiquity, are kept in great multitudes; and conspicuous dove-cotes, towering above the habitations of man, are seen

in most of the villages. These dove-cote pigeons procure their own food, and about the time when the corn begins to ripen, are joined by vast flocks of wild doves, which remain till the harvest is over. The young of the dove-cote pigeons are in high estimation, but the adults are tough and dry. The partiality of the Egyptians for young pigeons is noticed by Maillet (*Letter ix.*, p. 22). Thevenot, indeed, says that house-pigeons in Egypt are good for nothing, but he evidently alludes to the old birds and not to the young. In *Harmer's Observations*, vol. iv. (Ed. Clarke), the following passage occurs:—"The number of pigeon-houses is extremely great in Egypt, each habitation being terminated at the top by a pigeon-house above three-quarters of the way from the first cataract to Cairo. They are numerous also in Lower Egypt, and Maundrell found them as plentiful in some parts of Syria; there is reason to suppose that in the time when the Jews possessed their own country they were then as numerous there. Pigeons, however, do not seem to have bred as early in Palestine as in Egypt, since it appears, by a citation in Lightfoot, that their not being fledged and fit for use was one cause anciently of intercalating the year; young pigeons then were not to be commonly had in Judea till the passover, that is till April or May, but we find that there are young ones in Egypt, or at least in Upper Egypt, much earlier, for Dr. Pococke had a present of twelve pigeons made to him in January or February." *Young pigeons* were enjoined by Moses as a sacrificial offering.

On turning to an excellent copy of the celebrated Prænestine pavement, which abounds in the representation of various animals, and is therefore as interesting to the zoologist as to the antiquarian, we find pigeons and a pigeon-house represented on the banks of a river or canal; a man is apparently calling to the birds or inviting them to come down for food. The building has a sloped roof, with ranges of holes in the latter for the entrance of the birds. This barn-like building is an adjunct to what seems to be a splendid mansion.

"Who are these," says Isaiah, "that fly as a cloud and as doves to their windows!" an expression tending to prove that in his time these birds were kept in vast multitudes in Western Asia and the adjacent regions, and had dove-cotes expressly built for their accommodation.

In Persia pigeons from remote times have been kept in vast multitudes, and are so at the present time. It is probable that in ancient periods they were eaten (at least the young) as in other parts adjacent; such, however, is not generally the case now, they are kept only for the sake of their dung, which is essential as a manure for melon beds. The melons of Ispahan are celebrated for their superiority, and in the neighbourhood of that city

(and in numerous other localities) incredible numbers of pigeons are reared. Tower-like edifices are erected for their habitation in the outskirts of the town. These large round towers are larger in circumference at the base than at the top; they slope upwards like a windmill, and on the top are surmounted by a smaller tower, crowned by a sugar-loafed spire pierced with orifices through which the birds have the means of entrance and egress. Externally these conspicuous buildings are painted and ornamented, and are very picturesque; latticed windows admit light into them. The inside may be described as a honey-comb of breeding cells, each cell being occupied by its exclusive pair. These towers are private property, and are built by persons who rear these birds for the sake of their manure, which is in fact *guano*, and has been used time immemorial. "There is nothing new under the sun," certainly the manure which we call *guano*—that is, the accumulated dung of birds—is no novelty in agriculture. No fine melons, a fruit most desirable in Eastern countries, are grown in Persia where this *guano* is not used. Let it be remembered that melons are necessities not luxuries in Persia, where a man in rags may be seen squatted down in the street munching a melon which in our northern island would be acceptable on a nobleman's table. It is said that the Persian dove-cotes are not so well stocked as formerly, and that some are now almost if not entirely empty. Still, as it is, from some of these buildings the cloud of pigeons which emerge is sufficient to obscure the sun as they fly overhead, wheeling round and round, before they take their flight to their feeding grounds. Morier (*Second Journey*, p. 140) says of these flocks, that "their great numbers and the compactness of their mass literally looked like a cloud at a distance, and obscured the sun in their passage." What must be the noise of the multitude of their wings as they rush forth from their tower! To these flocks may be applied the words of Audubon, when describing the passenger-pigeon of North America. "At once, like a torrent, and with a noise like thunder, they rushed into a compact mass, pressing each other towards the centre. In these almost solid masses they darted forward in undulating and angular lines, descended and swept close to the earth with inconceivable velocity, mounted perpendicularly so as to resemble a vast column, and when high were seen wheeling and twisting within their continued lines, which then resembled the coils of a gigantic serpent. The air was literally filled with pigeons; the light of noon-day was obscured as by an eclipse."

The use to which the dung of pigeons is expressly appropriated in Persia—that is, to the manuring of melon grounds—leads us to reflect upon a passage in the Second Book of Kings,

(v. 25). Without paraphrasing a simple statement, we may quote the circumstances under which this article became so dear, in the words of the sacred volume, "And it came to pass after this, that Ben-hadad king of Syria gathered all his host and besieged Samaria; and there was a great famine in Samaria, and behold they besieged it, until an ass's head was sold for four-score pieces of silver, and the fourth part of a cab of dove's dung for five pieces of silver." Samaria was the chief city of a district of the same name, in the central part of Palestine—a fertile district, where we may suppose that melons were largely cultivated, and in ordinary demand; for the rearing of these, dove's dung was an essential, but the extramural dove-houses were in the hands of enemies; few were within the city walls. Yet, as was common, extensive gardens were within those walls (for oriental cities are not like those of modern Europe)—yet in these gardens the necessary fruit for popular consumption could not be grown for want of the proper manure, and the few intramural pigeon-towers could scarcely supply the quantity required; it therefore became dearer. On the other hand, this term "dove's dung" might have meant something very different to what the words imply; that is, some article of human food—pulse or grain. On consulting Dr. Kitto's note in the *Pictorial Bible*, relative to this point, we have the following analysis of the opinions of the learned. Looking at the measure and the price, the writer says—"This (cab) was about half a pint for 12s. 6d. There has been much diversity of opinion about this 'dove's dung.' Some of the Rabbins inform us that it was used for fuel, Josephus says that it was purchased for its salt; some think it means grain taken from the crops of pigeons, which of course could get out of the besieged town and feed in the open country; many believe that it was wanted for manure; and Bochart, followed by most modern commentators, contends that the name, though literally *dove's dung*, means an article of vegetable food. As he observes, the Arabs give the name of *dove's dung* to a kind of *moss* that grows on trees and stony ground, and also to a sort of *pulse or pea* which appears to have been very common in Judea, and which may be the article here indicated. Large quantities of it are parched and dried, and stored in magazines at Cairo and Damascus. It is much used during journeys, and particularly by the great pilgrim caravans to Mecca; and if the conjecture be correct, it may be supposed to be among the provisions stored up in the besieged city, and sold at the extravagant price mentioned in the text. It is clear that if *dove's dung* be really intended it could not be used as an article of food, and then we are thrown upon its use as manure. This use is best exemplified in Persia, where it is highly valued for quickening the growth and improving

the quality of melons and other esculent vegetables. These form such essential articles of food in some warm climates, that vast quantities are consumed, and in besieged towns persons who have been rather delicately brought up have been known to pine away and die for the want of such essential provision, even when corn was abundant. On this point Mr. Morier observes—"The dung of doves is the dearest manure which the Persians use; and as they apply it almost entirely to the rearing of melons, it is probably on that account that the melons of Ispahan are so much finer than those of other cities. The revenue of a pigeon-house is about a hundred tomauns per annum; and the great value of this dung, which rears a fruit that is indispensable to the existence of the natives during the great heats of summer, will probably throw some light on that passage of scripture where, in the famine of Samaria, the fourth part of a cab of dove's dung was sold for five pieces of silver."

For ourselves, we lean to the opinion that the term *dove's dung* was the name of some vegetable food, perhaps a pulse, perhaps a moss or lichen (thus in English hound's-tongue, mare's-tail, colts-foot, bird's-nest, bird's-tongue, and mouse-ear, mouse-tail, &c., &c.), but on this point we will not be positive; if the manure really be intended, we think that its use is clearly demonstrated.

All must have noticed the *gyratorial* or wheeling flight of our domestic pigeons—we here allude to this the more expressly as on this peculiarity depends, in our opinion, the facility with which these birds, taken to a long distance from their homes, find their way back when released from their confinement. Remarkable notices of pigeon-flights occur from time to time in the public papers, and wagers are often made upon the return of pigeons to a certain spot within a given space of time. If the distance be within twenty or even thirty miles, no previous training or especial practice is needed; but not so where the distance is very great. This flight cannot be compared to that of migration; the pigeon is influenced by pure *nostalgia*, it seeks its "old accustomed home" with intense desire, and in this effort it is aided by its mode of flight. The rationale of the pigeon's return home from a distance we take to be as follows. Pigeons fly in wide circles at a considerable elevation; they note every tower or steeple, every wood, every river, in fact every landmark within the range of their acute vision. Consequently, if taken to some distance beyond those well-known marks, let them only once in the wide circles they make get sight of them, or of one of them, they know how to steer their course, they hasten to the way-mark, and thence, towering aloft, descry their home. It is by sight that the pigeon makes these journeys, and it extends

its aerial circles in proportion to its distance from the known way-marks; should these be obscured by a fog or clouds, the bird wanders at random, and perhaps never finds its way back. In order to perform long journeys, as from some town in France, Belgium, or Holland, to Dover or London, the birds require training; they are taken at intervals to places farther and farther remote from their home, and thus they become acquainted, from their elevation in the air, with a terrestrial expanse beneath them of vast extent. One or two well trained birds will serve as guide to a less practised flock, and lead them to their destination. We occasionally read in the public papers of several pigeons being let loose in Antwerp, or St. Omer, or some other town, destined to return to London within a given time for a wager, and the details as to the time of the arrival of the several birds are recorded. There is less mystery in all this than may at first appear. The keenness of the pigeon's vision, its rapidity of flight, its enduring strength of wing, and its acquaintance with the way-marks beneath it, are sufficient to account for the performance of the exploit. When first turned off, the birds gyrate to a great altitude; let one known way-mark be seen, it is sufficient—the direction is clear; other way-marks present themselves in succession, till at length the aerial traveller discerns its longed-for home—"Radit iter liquidum; nec celeres commovet alas."

We may now proceed to a brief notice of the principal varieties of our domestic pigeon, premising that, from time to time, under the culture of experienced fanciers, others may originate with which we have no personal acquaintance. As we have just discussed the principles which to our mind clear up the difficulties relative to the return of a pigeon from great distances to its home, we shall commence with that variety, of oriental origin, which time immemorial has been employed as a messenger, carrying communications of importance or letters of confidence.

1. The CARRIER or HORSEMAN.—Fanciers of the present day in the neighbourhood of London apply the terms *carrier* and *horseman* to a very remarkable breed of pigeons which is sedulously cultivated. Whether, originally, any distinguishing character separated the carrier and the horseman we cannot ascertain; if such was the case they exist no longer, and the terms have become synonymous.

The carrier is a splendid bird, remarkable for the elegance of its contour; it is of large size, and, if kept in training, of extraordinary powers of wing. The shoulders, when the wings are closed, are broad and strongly knit, the breast is full and muscular, the wings long and acute, with very rigid quill-feathers, and indeed the general plumage is close and compact; the neck is long

and slender, the head narrow, and flat on the crown, and the eye animated. The colour of the iris varies; in some it is of a fiery red, in others of a pinky pearl tint. The eye is surrounded by a rosette or rose-like circle of carunculated fungous skin of a white colour, which in adult birds is very conspicuous, and often rises above the level of the top of the head; this rosette should be well and regularly formed, with the eyelids fairly opened and in the centre. In good birds it equals a shilling in diameter. The beak is long, measuring



THE CARRIER PIGEON.

by the gape, from an inch and a-quarter to an inch and a half—it should be strong and straight; at the base of the upper mandible the soft pulpy skin is developed into a large white fungous excrescence, which advances boldly on the forehead, and spreads broadly across the beak; this protuberance should overtop the narrow flat skull, at least in adult birds, for in the young of the year both this protuberance and the rosette are comparatively small, and always smaller in the female than in the male.

The carrier is elongated in general shape, and carries itself gracefully. It varies in colour; we have seen black, blue, dun, white, and blue and white breeds; duns are in great estimation, and three or four pounds is not an uncommon price for a pair of perfect young birds.

Though this variety is called the "*carrier*" *par excellence*, from its powers of wing and rapidity of flight, still any of the common breeds, enjoying the faculty of swift flight may be, and are, used as carriers, and the practice of sending off pigeons, after races and other matches, bearing the name of the winner, is a very common but not always very creditable practice. Pigeons in fact are now principally used in our country as messengers from the race-course, the prize-ring, or the walking ground, in order to enable persons, on gaining the information they convey, to make

nefarious bets; we believe also that they traverse the channel with notices relative to stock-jobbing transactions, but we cannot say to what extent this mode of communication is carried on. We have read remonstrances on the subject, and occasionally, as we have heard, some of the unconscious messengers have been shot.

In the fine picture of the siege of Saragossa by the late Sir David Wilkie, we see a carrier pigeon in the hands of the assembled group, with a small letter or billet under its wing. In this manner it is probable that the besieged held communication with their allies beyond the lines of the enemy.

With reference to the use of this pigeon in ancient times, we may quote the following passage from the Penny Cyclopædia:—"In one of his odes (*εἰς νεμερτέαν*) Anacreon has immortalized it as the bearer of epistles. Taurosthenes sent to his expectant father, who resided in Ægina, the glad tidings of his success in the Olympic games on the very day of his victory. Pliny (*Nat. Hist.* lib. x., 37) speaks of the communication kept up between Hirtius and Decimus Brutus at the siege of Mutina (Modena). What availed Anthony the trench and the watch of the besiegers—what availed the nets stretched across the river, while the messenger was cleaving the air. The Crusaders employed them, and Joinville records an instance during the crusade of St. Louis. Tasso (*Gierusalemme Liberata*) sings of one that was attacked by a falcon and defended by Godfrey; it had a letter attached to its neck, which Godfrey of course reads, and is put in possession of all the secrets. In the same way Ariosto makes the Castellan di Damietta spread the news of Orrilo's death all over Egypt. Sir John Maundeville, knight, warrior, and pilgrim, who penetrated to the border of China, in the reigns of our Second and Third Edward, thus writes:—"In that contree and other contrees bezonde, thei han a custom, whan thei schulle usen werre, and whan men holde sege abouten cytee or castelle, and thei withinnin dur not senden out messagere fro lord to lord, for to aske sokour, thei maken here letters and bynden them to the necke of a *Colver*, and letten the *Colver* flee; and the *Colveren* ben so taughte that they fleen with the letters to the very place that men wolde sende hem to. For the *Colveres* ben norysscht in the places where thei ben sent to; and they senden them thus for to beren here letters. And as the *Colveres* retournen azen where as thei ben norisscht, and so they don comounly."

The pigeon continued in use in the East as an important messenger till within a very recent period, nor perhaps is its employment in some countries altogether obsolete. Dr. Russell, speaking of the carrier, says—"This pigeon in former

times was employed by the English factory to convey intelligence from Scanderoon of the arrival of the Company's ships in that port. The name of the ship, the hour of her arrival, and whatever else could be comprised in a small compass, being written on a slip of paper, was secured in such a manner under the pigeon's wing as not to impede its flight; and her feet were bathed in vinegar with a view to keep them cool and prevent her being tempted by the sight of water to alight, by which the journey might have been prolonged, or the billet lost. The practice has been in disuse many years, but I have heard it asserted by an English gentleman, in whose time it still subsisted, that he has known pigeons perform the journey (to Aleppo) in two hours and a half.* The messenger had a young brood at Aleppo, and was sent down in an uncovered cage to Scanderoon, from which place, when set at liberty, she returned with all expedition to her nest. It was usual at the season of the arrival of the annual ships to send pigeons to be ready at the port, and, by all accounts, if the bird remained absent above a fortnight she was apt to forget her young, and therefore not fit to be trusted. Upon inquiring into the manner of training the pigeon for this service, I was told by some that she was at once sent down to Scanderoon in a cage; but I am rather inclined to believe what was affirmed by others, that she was taught by degrees to fly from shorter distances on the Scanderoon road. The editor was informed that the pigeons when let fly from Scanderoon, instead of bending their course to the high mountains surrounding the plain, mounted at once directly, soaring almost perpendicularly till out of sight, as if to surmount at once the obstacles intercepting the view of their place of destination."

We have heard and read extraordinary instances of the rapidity of flight of the carrier pigeon; but from what we have ourselves observed (and we have kept these birds and tested their powers), we should say that their average speed did not much exceed a mile a minute. No doubt that with the wind decidedly in their favour their progress is far more rapid, and much, of course, will depend upon their training, their condition, and their eagerness to reach home. We have read, for example, of two carriers taken from Cologne to Paris, and there freed from captivity precisely at eleven in the morning, reaching their home, one at five minutes past one o'clock (the same day), the other at fourteen minutes past one, thus performing their journey nearly at the rate of a hundred and fifty miles per hour.—(*Antoine Animaux Célèbres*, ii., 121). This is terrible velocity; but can we depend on such marvellous narratives? According to the observations of

* The distance is about 52 miles.

Audubon, the passenger-pigeon of America flies at the rate of about a mile a minute—that is, in performing its journey from its distant feeding grounds to its wonted roosting-place. When alarmed, it can exert greater speed; and, no doubt, the carrier can do the same, but not, we suspect, for a great length of time. We are apt to be deceived in calculating the rapidity of the flight of birds by watching them in their course through the air. Small bodies quickly passing by, and at some elevation, their velocity seems greater than it is, and it is seldom that it can be accurately tested—at least, in the case of birds.

It is probable that the carrier has degenerated in this country; for formerly a distinction appears to have been made by fanciers between this pigeon and the horseman, the latter being a smaller and lighter bird, with less development of the *wattles* and *rosette*. Perhaps the two breeds are inter-blended, and so are called by each title indiscriminately.

2. The DRAGON, or DRAGOON.—This variety results from a cross between the preceding and some of the ordinary breeds. In general appearance it approximates to the carrier, but is inferior in size, less robustly formed about the shoulders, and with the caruncles or *wattles* and the *rosette* more circumscribed. Like the horseman, this variety has been employed in carrying written messages, and indeed is far more generally used by those who attend races, &c., than the former, which is too valuable for its owner to run the risk of losing. The flight of the dragon is very impetuous, and hence perhaps its name. We have known dragons imposed by dealers as horsemen or carriers upon these who were not versed in fancy lore.

3. The BARB.—This pigeon, formerly very much admired by fanciers, and still not without its advocates, appears, if we may rely on its name, to have originated in some part of Northern Africa. It is a bird of delicate temperament, and not adapted for long or rapid flight. It is fitted exclusively for the pigeon aviary; indeed, we do not remember to have ever seen it at large. Its plumage is mostly black, sometimes (but rarely) dun; the beak is short and stout, with a small carunculated wattle at the base; a broad naked circle or rosette of scarlet spongy skin surrounds the eye; the back of the head is mottled, ornamented by a short crest of curled or upturned feathers. The barb is not a common variety, and is, perhaps, scarcer than it was some years since.

4. The POUTER.—All pigeons, as is well known, have the capability of inflating their crop with air; and a fine pigeon, with breast feathers glossed with metallic tints, strutting and bowing with inflated crop around his mate, presents no uninteresting spectacle; but this remark will not

apply to the pouter, and we wonder that this variety should have received so much attention from fanciers. There is nothing pleasing in its appearance or graceful in its proportions; indeed, the inflation of the voluminous crop, rendering an erect, stiff, and apparently constrained attitude necessary, gives an aspect of distortion, or of a want of a due balance of parts. The pouter is of large size, often measuring eighteen inches in length from the tip of the beak to the end of the tail. The chest is not really voluminous, though it appears enormous when the crop is distended with air; the back is concave, and the tail ample; the tarsi are very long, and covered with downy feathers. These pigeons are of various colours, as blue, rufous, pied, or altogether white. Those birds which are tall, erect, with a very ample crop, and with the colours of the plumage regularly disposed, and according to certain fancy rules, are esteemed the most valuable. The pouter is formed by a cross between the *dragon* and the *old Dutch cropper*, which latter bird, except in the development of the crop (whence its name), had nothing to recommend it. From this intermixture, not without much care and expense, has resulted this favourite variety. The flight of the pouter is buoyant, but not rapid, nor capable of being long sustained. As varieties of the pouter, or rather as breeds allied to it, may be mentioned the *uploper* and the *Parisian pouter*, said to be a beautifully marked bird; but with these we have no personal acquaintance.

5. The FAN-TAIL, or BROAD-TAILED SHAKER.—This is a very singular variety, by many much admired. It is a small pigeon, with a preternatural development of the caudal feathers, both as to number and size. These feathers amount usually to about sixteen, but in extraordinary birds even to twenty-six (the normal number in the pigeon being twelve). These feathers, moreover, are elevated, and form two parallel planes, not unlike those of the common hen, but larger in proportion. The neck is long, and singularly slender, and is surmounted by a small head with a short beak. This bird has the habit of throwing back the head till it almost, if not quite, touches the tail feathers; the chest is thrown forwards, the wings droop, and the neck vibrates with a strong quivering motion. This is the attitude of courtship. The best *fan-tails*, we believe, are of a pure white; pied birds are in less estimation. As might be presumed, the powers of flight in this variety are very limited. It is exclusively a fancy bird. Some persons discriminate a variety which they call the *narrow-tailed shaker*, but this is only a degenerate breed of the fantail, or the result of a cross.

6. The JACOBINE, or CAPPER.—This is an elegant little sort of fancy pigeon in considerable

esteem. Its principal characteristic consists in the elongation and silky loose texture of the feathers of the back and sides of the neck, which are brought forward in such a manner as to form a sort of hood over the head, and extend in a double frill down the chest, producing a very pleasing appearance. The head is small, with a short beak, and a pear-coloured iris. The jacobine varies in colour. Those of a fawn yellow are generally preferred. Flight indifferent.

We may here notice two varieties called the *capuchin* and the *ruff*. These, in general characters, approximate to the jacobine, but have less luxuriance of the plumage of the neck and chest.

7. The *TURBIT*.—The upper part of the chest of this pretty little fancy pigeon is ornamented with a tuft of feathers, which opens both ways and laterally with a curl. The head is small, and the beak short; in colour this bird is subject to variety, but generally has the quills, tail, and under parts white.

A variety closely resembling the *turbit* is called the *owl*, from the form of its beak, which is short, thick, and hooked. It has a pectoral frill of curled feathers.

8. The *NUN*.—Many persons greatly admire this elegant pigeon, which is indeed amongst the prettiest of our varieties. The head, quills, and tail are black (sometimes fawn yellow, rarely blue), while the rest of the plumage is snowy white. On the top of the black head is a tuft of soft loose white feathers, which, forming a snowy hood, in conjunction perhaps with the contrast of black and white, has led to the name by which this variety is known.

There is a variety of *nun*, termed the *helmet*, from the disposition of the feathers which form the crest; instead of resembling a full hood, the crest rises in something of the shape of a helmet.

9. The *TRUMPETER*.—It is from the peculiar loudness and harshness of its cooing notes that this variety has received its name. Its colour varies, but the tarsi are feathered to the toes, the back of the head is crested, and a tuft springs from the base of the beak over the forehead. We do not remember to have seen any genuine fancy birds of this variety, but the truth is that among all fancy pigeons changes are gradually taking place; varieties once highly prized, and selling for large sums with ready purchasers, are now neglected and passing away; we think moreover that pigeon fancying altogether is on the decline, and if our suspicions be correct, the causes are too obvious to require much seeking for. This change may be perhaps in itself of no moment, but trifles in human society are often the indicia of circumstances or affairs of importance. Pigeon fancying is one of the innocent amusements of persons of the great middle classes, and of

those of superior grade in the so-called lower; it is a natural amusement, and also interesting, but it is not unattended by some degree of expense.

10. The *TUMBLER*.—This variety of pigeon needs not any description; it is everywhere common, and is kept in abundance in simple aviaries on many of the house-tops, even in the denser parts of the metropolis; flocks of them, especially in clear mornings, are turned out in order to exercise themselves for an hour or two, in their circling flight and aerial gambols. There are several varieties of these birds, as *baldheads*, which have the head white, and *bearded tumblers*, either blue or black, with a white moustache or stripe extending from the base of the lower mandible along the sides of the throat.

The flight of a flock of *tumblers* is very interesting; the birds keep in compact array as they wheel around, every now and then making backward somersets, turning completely round in the air, which for a moment checks their flight, when recovering their wings they again pursue their course. On descending from their elevation and preparing to alight, these somersets are repeated in frequent succession before they gain their feet; but whether from mere playfulness, or because they cannot help it, we could never satisfactorily determine. The bird is light, vigorous, and capable of long continuance in the air without the slightest fatigue. In the tumbler the figure is compact, the chest broad, the neck rather slender, the head small and round, the beak short and spine-shaped, the iris of a clear pear-colour.

11. The *ALMOND TUMBLER*.—In size this once-prized fancy-bird is very small, and delicately framed. It is derived by the breeder's art from the stock of the common tumbler, but is not a bird of much power of flight, being rather fitted for the aviary than for the ordinary pigeon-house; its head is round and small, its beak very short and spine-shaped; its iris pear-colour. The tints of its plumage are beautiful but varied; yellow, black, white, brown, and gray, more or less of these colours being intermingled and blended so as to produce a very pleasing effect. Formerly birds of this kind, perfect as to the required distribution of colour, sold for considerable sums; but they are now, we believe, less valuable. Sir John Sebright's breed of Almond tumblers was some years since perhaps the first in England.

To the varieties already enumerated we might add several others, as the *spot*, the *lace*, the *finikin*, and the *Friesland runt*, with reversed feathers; but these breeds are not common, nor are they held of much account. As for such birds as the *French runt*, the *Leghorn runt*, the *Spanish runt*, &c., they are not to be placed among the fancy varieties, being remarkable merely for size; they are dove-house pigeons.

Domestic pigeons are fed on horse beans, gray peas, barley, and other grain; they require plenty of fresh water, and love to bathe—cleanliness is imperative; their breeding-boxes should be frequently cleaned out and lime-whited, as should also the aviary in which they are kept, and its floor swept and sanded. Pigeons are extremely partial to salt and old mortar, and will pick the

latter from between the earthen tiles forming the roofs of houses. Many fanciers make a composition of salt, mortar, a little clay, and spicy seeds, as caraway; placed so as to be accessible to the birds; and compositions of a similar nature are used by some in a dishonest way, as an allurement to entice stray birds, or those of their neighbours, to enter into their traps.

CHAPTER VI.

GENERAL HISTORY OF THE NATATORIAL ORDER (NATATORES), AND OF THE DOMESTIC SPECIES RECLAIMED FROM IT.

THE natatorial order (*ordo anseres*, Linn.) affords to man reclaimed species which may vie in point of intrinsic value with those which he has selected from the gallinaceous order. From the latter we obtain the fowl, the peafowl, the turkey, the guinea-fowl, setting aside game, as the pheasant, partridge, grouse, black-cock, capercaille, ptarmigan, &c., &c., which we cannot regard as belonging to domesticated stocks, though the pheasant takes up a debateable ground. The natatorial order gives us the duck, the musk-duck, the goose, the Chinese goose, the Canada goose, the Egyptian goose, and we may add the swan, as reclaimed species, while, as a counterbalance to pheasants and partridges, &c., we may enumerate the wild duck, the pochard, the shoveller, the gadwall, the pintail, the teal, and others, all excellent for the table, and testing, even more than grouse, the skill, nerve, and endurance of the sportsman. On this point Colonel Hawker may be referred to.

Like most other orders, the order *natatores* is divided into families, and these again into minor sections or subfamilies; but into these details we shall not enter, we shall only observe that the so-called families *Anatidæ*, *Colymbidæ*, *Alcadæ*, *Pelecanidæ*, and *Laridæ*, are those into which this order is divided. The order is not natural (excepting in generalities such as would link the eagle and the crow and the thrush together), and its families are in themselves orders. We acknowledge that, in the present pages, disquisitions on such subjects will be out of place. Let, however, the reader compare together the duck and the man-of-war bird (*tachypetes*), and the petrel and the penguin. We may as reasonably put the curlew and the hawk, the swallow and the apteryx, into the same order.* "*Philosophia abest.*"

* The science of ornithology does not advance *pari passu* with the discoveries of multitudinous species before unknown. It is true that genera and subgenera are made (not established) *ad infinitum*, and on such points that not one genus can be recognised by the description. There are, in fact, almost as many genera as species. This is lamentable—ornithology wants re-casting.

To enter into a general outline of the characters of the order *natatores*, as it at present stands, is here out of the question. To the so-called family *anatidæ*, or duck-tribe, our attention must be solely directed.

Throwing overboard the subdivisions of this family, based on fluctuating theories, proposed by various ornithologists, we may state that it embraces the ducks, the swans, the geese, and the mergansers.

To this section belong certain qualities in common. The species are all more or less aquatic in their habits, are long-necked, and have a boat-shaped body, covered with large, well compacted, and nicely arranged waterproof feathers, concealing an under-vest of fine close down. The wings are moderate and acute, with rigid quill feathers; it is not, however, until the birds mount to a great elevation that their flight becomes easy, but this altitude attained, they are strong on their pinions. They fly in order, with a leader, changed from time to time; sometimes the aerial troop is marshalled in Indian file, this is suddenly exchanged for two lines *en triangle*—that is, forming the two lines of a triangle without the base line—the leader being at the apex; sometimes they form solid masses of serried columns, but, except when suddenly aroused by the gunner from their slumbers on the water, they generally assume a definite figure in flight, and especially during their long migratory journeys, uttering, as they fly far above head, their wild sonorous cry. Occasionally single birds as pioneers advance before the troops, or others as rear-guards follow the squadron. To one of these lonely birds, on its migration to the desolate regions within the polar circle, Bryant addresses some exquisite lines, which, were they not generally known, might be quoted with propriety.

On the ground, the *anatidæ* are awkward and waddling, their legs are short and placed considerably backward, so that the fore-part of the body

preponderates, and the webbed or oar-formed toes are destitute of elasticity. Some species, however, are much more fitted for terrestrial habits than others, as the *Cereopsis* goose of Australia, a bird which might be easily naturalized, and is valuable for the sake of its flesh. Some are semi-arboreal, roosting on the branches of trees, and rearing their young in nests built either in the holes of trees, or on the forks of the larger branches. As an example, we may allude to the beautiful summer duck of America (*Dendronessa sponsa*).



THE SUMMER DUCK.

This bird rears her young in the holes of trees, generally overhanging the water. When strong enough, the young "scramble to the mouth of the hole, launch into the air with their little wings and feet spread out, and drop into their favourite element; but whenever their birth-place is at some distance from it, the mother carries them to it, one by one, in her bill, holding them so as not to injure their yet tender frame. On several occasions, however, when the hole was thirty, forty, or more yards from a bayou or other piece of water, I observed that the mother suffered the young to fall on the grasses and dried leaves beneath the tree, and afterwards led them directly to the nearest edge of the next pool or creek."—*Audubon*.

In the *anatidæ* the bill is large, more or less depressed, broad, and covered with a sensitive coriaceous membrane, the upper mandible is furnished at the tip with a hard nail or *dertrum*, the edges of each mandible internally are laminated, or furnished with close-set transverse lamellæ, which are more developed in some species than others. In the shoveller duck, for example, this lamination is highly developed, and presents the appearance in both mandibles of a fine pectinated or comb-like appendage, accompanied with great dilatation and depression of the front part of the bill, which is spatulate in form and outline. This pectination acts as a strainer, while the bill, freely supplied by branches of the fifth pair of nerves, is engaged in probing and testing the mud in search

of food. Thus the beak is at once a feeler, a strainer, and an organ of prehension. In accordance with the structure and sensibility of the beak is the tongue modified. It is also a sensitive organ, and, instead of being slender and horny, is large and fleshy, and furnished on its edges and other parts with fimbriations or appendages. The tongue co-operates with the mandibles in the discrimination and appropriation of food. The peculiar action of the mandibles of the duck while probing the mud for food cannot have escaped observation. Yet the ducks exhibit different modes of feeding, to say nothing of different partialities according to the species. Mr. Skelton, the intelligent keeper of a decoy in Lincolnshire, supplied Dr. Richardson with the following information:—"The mallard, pintail, and teal frequent rich flooded lands, *swittering with their nebs in the soil*, and sucking out its strength; but the widgeon feeds quite differently, being an *amazing fowl to graze, a strange eater of grass*." "It is especially fond of flutter-grass (*glyceria aquatica vel fluitans*), which it crops on the surface of the water, but it likewise eats many other herbs. When the decoy has been so full of widgeons that they have devoured every blade on the landings, Skelton has taken advantage of their absence in the night, when they resort to the green salt-marshes on the sea-coast, and laid down sods pared from the fields, on which they readily graze. In common, however, with the mallard, teal, and pintail, they are fond of willow-weed seeds (*epilobium*), with which he feeds all the fowl in his decoy, as they prefer it to oats and every other kind of grain." In the *Fauna Boreali-Americana*, Mr. Waterton states that the widgeon feeds by day, eating grass like a goose, while its congener, the mallard or wild duck, invariably refuses this food, and seeks for its sustenance by night.

In all the *anatidæ* the gizzard is peculiarly strong and muscular, but amazingly so in the tribe or section of *diving ducks*, such as the eider, the golden-eye, and others, which feed chiefly on shell-fish, which they obtain by diving into the sea, or about the mouths of rivers. The shells are ground and crushed to fragments by the action of the powerful gizzard. None of the *diving ducks* are domesticated.

We may here observe that the ribs in the *anatidæ* in general, but especially in the diving ducks and such as are most aquatic, are carried out to a great extent posteriorly, so as to protect the abdominal viscera from the pressure of the water during the submersion of the body.

Most of the birds of this family present something peculiar in the construction of the trachea. In some species the trachea is singularly convoluted, as in many of the swans; in others there is at the lower part of the trachea, just within the

chest (in the male), an osseous drum or *bullæ*, which influences the tones of the voice.

The family *Anatidæ* is resolvable into the following sections:—1. The True Ducks (*Anatinæ*), with the hind toe non-lobated; 2. The Diving Ducks (*Fuliginæ*), with the hind toe lobated; 3. The Swans (*Cygninæ*); 4. The Geese (*Anserinæ*); 5. The Mergansers (*Merganinæ*), birds essentially aquatic, with oar-like toes, and legs compressed and placed as far backwards as possible. With the diving ducks and mergansers we have no present concern.

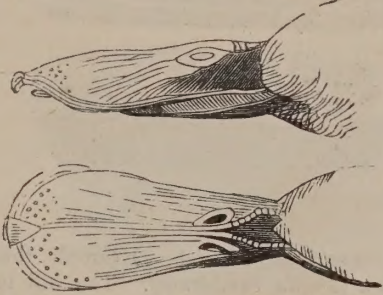
SUBFAMILY ANATINÆ, DUCKS.

Mr. Yarrell (in *Linn. Trans.*, vol. xv., p. 378) makes the following excellent observations on this group or subfamily:—

"The first division of the true ducks will contain the shiel-duck, the Muscovy (musk) duck, the gadwall, shoveller, pintail, widgeon, bimaculated duck, gargany, teal, &c., all of which will be found to have the following characters in common:—Externally they exhibit considerable length of neck; the wings are also long, reaching to the end of the tail; the tarsi somewhat round; the hind-toe free, having no pendent lobe. In habits they may be stated generally as frequenting fresh water, but passing much of their time on land, feeding in ditches and about the shallow edges of pools on aquatic plants, insects, worms, and occasionally fish, taking their food at or near the surface, possessing great powers of flight, but seldom diving unless pursued. Of their internal soft parts, the stomach is in the greatest degree muscular, forming a true gizzard; the intestines long; the cæcal appendages from six to nine inches in length in the larger birds, and decreasing only in proportion to the size of the species. Of the bones, it may be observed that the ribs are (comparatively) short, extending but little beyond the line of the posterior edge of the sternum; the keel of the breast-bone deep, affording great extent of surface for the insertion of large and powerful pectoral muscles. The osseous enlargement (or drum) at the bottom of the trachea is in all of them composed of one bone only. The wild duck may be considered the type of this division."

To this summary we may add, that in all the genera the beak is modelled on the same plan, while at the same time it exhibits certain minor variations of form, in accordance with the peculiar food upon which the species subsist. Thus in the grass-feeding widgeon it is more like that of the goose (a cropper of herbage) than that of the common duck or the shoveller. A few examples of the principal modifications in the form of the bill in the *anatinae* may here be given with propriety. Some of our readers, we are sure, will feel interested in the subject.

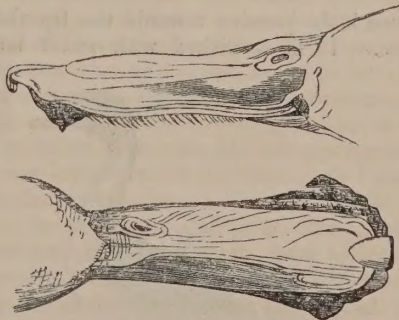
1. Genus *Spathulea*, Fleming (*Rhynchopsis*, Shaw; *Anas*, Swainson). Example, the Shoveller (*Spathulea clypeata*). Locality, Asia, Europe, and North America. The form occurs in Australia.



BILL OF SHOVELLER.

The bill is remarkable for its breadth anteriorly, its depression, its flexibility, and the fine and long lamination of the edges of the mandibles. The upper mandible overlaps the lower, and partially conceals it. Dertrum small and hooked. This form of bill (and that of others similar in structure) is adapted for "swittering" in the ooze, and "sucking out its strength."

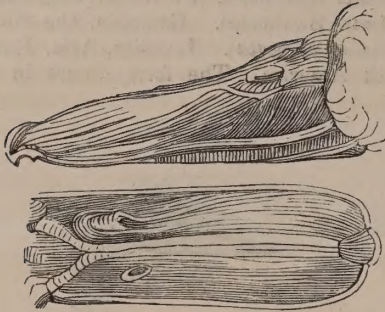
2. Genus *Malacorhynchus*—a genus of broad and soft-billed ducks peculiar to the southern



BILL OF MALACORHYNCHUS.

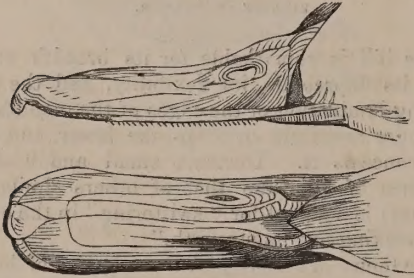
hemisphere. The breadth of the bill and the length of the laminae are nearly the same, but the edge of the upper mandible is furnished with a thin membranous and sensitive skin, which projects considerably, and hangs down on each side. Dertrum small and hooked.

3. Genus *Chauliodus* (*Chaulelasmus*, G. R. Gray). Example, the Gadwall (*Chauliodus strepera*, Swainson). Bill of nearly equal breadth, but slightly broader towards the tip than at the base. Laminae numerous, fine, and distinct. Locality, Asia, Europe, North America.



BILL OF GADWALL.

4. Genus *Dafila*, Leech. Example, the Pintail Duck (*Dafila caudacuta*). The bill in this



BILL OF PINTAIL.

genus is a little broader towards the tip than at the base. It is furnished with small laminae

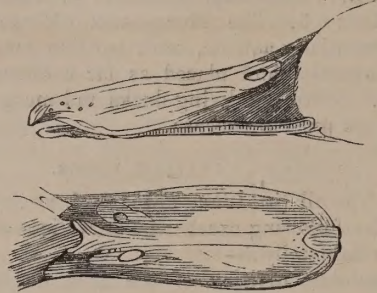


PINTAIL DUCK.

almost concealed by the edge of the upper mandible. Locality—the pintail is common to Europe, Asia, and North America. The flesh of this species, called, from the form of the tail and the elongation of the two middle feathers, the sea-pheasant, is of very superior quality. It is a

regular winter visitant to our island, and is captured in considerable abundance in the decoys of Lincolnshire, Norfolk, &c.

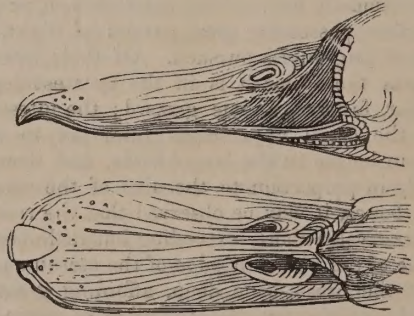
5. Genus *Querquedula*, Stephens. Example, the Teal (*Querquedula crecca*). The bill in this



BILL OF TEAL.

beautiful bird is somewhat ovate, being widest near the centre. The laminae are small. The dertrum moderately hooked. The American teal is regarded by Bonaparte as distinct from the Old World species.

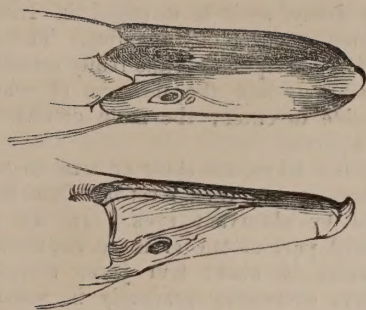
6. Genus *Anas*, Linn. and Selby (gen. *Boschas*, Swainson). Example, the Wild Duck, or Mallard (*Anas boschas*). Bill depressed and



BILL OF MALLARD.

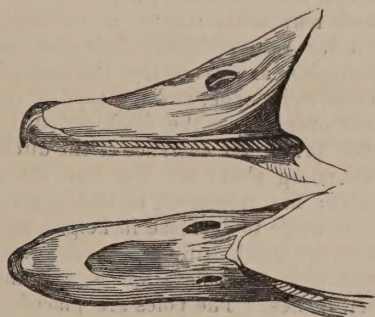
broad; rather wider towards the tip than at the base. Mandibles toothed rather than lamellated—that is, dentato-laminate. Dertrum convex, but not fairly hooked.

7. Genus *Mareca*. Example, the Widgeon (*Mareca Penelope*, Selby). Bill high at the base, and strong; length moderate, or rather short, narrower and more contracted towards the tip. Dertrum convex and stout. Laminae broad, and set wide apart. We have here an approximation in the form of the bill to that of the goose; and, as we have already said, the widgeon is a grass-grazer. An allied species in America represents that common to Europe and Asia.



BILL OF WIDGEON.

8. Genus *Dendronessa*. Example, the Summer Duck (*Dendronessa sponsa*). Bill very high



BILL OF SUMMER DUCK.

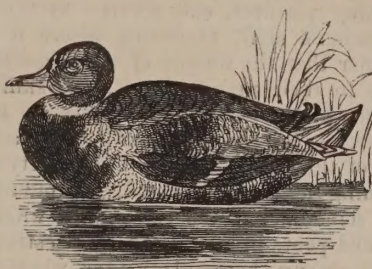
at the base, narrowing towards the top, with nostrils placed almost centrally in the upper mandible. Laminæ broad and wide apart. The summer duck is a native of America, where it is migratory. An allied species, the Chinese teal, is a native of China and the surrounding border countries. Habits arboreal. Both these species breed freely in our aviaries.

Having thus entered somewhat more explicitly than is generally done in works of the present nature (which, indeed, are seldom attempted by professed naturalists) into the characters of the *anatinae* or true ducks, we shall now advert to the domestic species of this group, of which two only have been reclaimed

The COMMON DUCK (*Anas boschas*, Linn).—It is from the common wild duck or mallard (*Le Canard Sauvage* of Buffon) that the domestic duck is derived, although we know nothing of the circumstances how, or the time when, the domestication of our tame race was effected. One thing, however, is very certain—the wild breed and the tame will freely intermix, and the progeny partake rather more decidedly of the habits and manners of the former than of the latter.

There are indeed many points, irrespective of

colour (which is, of course, variable in our domestic breeds), in which the tame and the wild duck differ. The tame duck is polygamous, but the wild duck mates; and here a slight sketch of the habits and manners of this species may be advisable.



WILD DUCK OR MALLARD.

The wild duck is very widely distributed throughout the temperate and colder latitudes both of the old and new world. Generally speaking it is migratory in its habits, the vast flocks which visit the south in winter retiring on the approach of spring to their high northern breeding places. In our island the species is indigenous, and although drainage and the cultivation of boglands have rendered it far more scarce than formerly, still it is to be found wherever suitable retreats afford it a congenial asylum. Few sheets of water in parks are destitute of their home-bred wild ducks, and it still tenants the borders of our lakes and rivers in secluded localities. So abundant was the wild duck formerly in our fenny districts, that, according to the authority of Pennant, at a single driving in the fens of Lincolnshire, before the young had taken wing, and when the old birds were in the moult, one hundred and fifty dozens have been taken. Mr. Selby observes that, in the same district at the present day, there are not reared more than a dozen broods annually. Scanty, however, as our native flocks may be, their numbers are augmented by winter arrivals from the north, and of these thousands are taken in decoys, or fall before the withering fire of the wild-fowl shooter. Innumerable multitudes visit Holland, Belgium, and the marshy districts of France, whence, during the latter part of autumn and through the winter, thousands are sent to the London markets. This wholesale destruction of the wild duck, so valued for the flavour and delicacy of its flesh, is not confined to Europe. Wilson, in his *American Ornithology*, gives the following details:—

“On some ponds frequented by these birds, five or six wooden figures, cut and painted so as to represent ducks, and sunk by pieces of lead nailed on the bottom, so as to float at the usual

depth on the surface, are anchored in a favourable position for being raked from a concealment of brush, &c., on shore. The appearance of these usually attracts passing flocks, which alight, and are shot down. Sometimes eight or ten of these wooden ducks are fixed on a frame in various swimming postures, and secured to the bow of the gunner's skiff, projecting before it in such a manner that the weight of the frame sinks the figures to their proper depth; the skiff is then dressed with sedge or coarse grass, in an artful manner, as low as the water's edge, and under cover of this, which appears like a party of ducks swimming by a small island, the gunner floats down, sometimes to the skirts of a whole multitude, and pours in a repeated and destructive fire of shot among them. In winter, when detached pieces of ice are occasionally floating in the river, some of the gunners on the Delaware paint their whole skiff or canoe white, and laying themselves flat at the bottom, with their hand over the side, silently managing a small paddle, direct it into or near a flock before the ducks have distinguished it from a floating mass of ice, and generally do great execution among them. On land another stratagem is sometimes practised with great success. A large tight hogshead is sunk in the flat marsh or mud, near the place where the ducks are accustomed to feed at low water, and where otherwise there is no shelter. The edges and top are artfully concealed with tufts of long coarse grass and reeds or sedge. From within this the gunner, unseen and unsuspected, watches his collecting prey, and, when a sufficient number offers, sweeps them down with great effect. The mode of catching wild ducks, as practised in India (*Naval Chronicle*, vol. ii., p. 473), China (Du Halde, *Hist. of China*, vol. ii., p. 142), the island of Ceylon, and some parts of South America (Ulloa's *Voyage*, vol. i., p. 58), has been often described, and seems, if reliance may be placed on those accounts, only practicable in water of a certain depth. The sportsman, covering his head with a hollow wooden vessel or calabash, pierced with holes to see through, wades into the water, keeping his head only above, and, thus disguised, moves in among the flocks, which take the appearance to be a mere floating calabash, while, suddenly pulling them under by the legs, he fastens them to his girdle, and thus takes as many as he can conveniently stow away, without in the least alarming the rest. They are also taken with snares made of horses' hair, or with hooks baited with small pieces of sheep's lights, which, floating on the surface, are swallowed by them."

For an account of shooting from a hut, as practised in France, we refer our reader to Colonel Hawker's *Instructions to Young Sportsmen*. No mode, however, of taking wild ducks equals that

of the decoy, as it is managed in Lincolnshire and some of our fenny counties. The following is a brief description of this really scientific mode of operation, into the minutiae of which it is impossible to enter; the main details, however, may be given.

In the lakes, marshes, or fens to which the wild ducks resort, their most favourite haunts are marked by observant eyes. In the most sequestered part of one of these haunts a ditch is cut, which is about four yards across at the entrance, decreasing gradually in width to the farther extremity, which is not more than two feet wide. This ditch is of a semicircular form, but does not bend much for the first ten yards. The banks of the lake or sheet of water on each side of this ditch, or *pipe* as it is called, are kept clear from reeds, coarse herbage, &c., in order that the wild-fowl may make them a resting-place, on which to luxuriate and dress their plumage. Along the ditch, poles are driven into the ground on each side, close to its edge, and the tops of these poles are bent over across the ditch and tied together; thus they form at the entrance of the ditch, or *pipe*, an arch rising about ten feet from the surface of the water; but this arch, or rather succession of arches, is made to decrease in height, as the pipe decreases in width, till, at the extremity of the ditch or pipe, the elevation is not more than eighteen inches. The poles are placed about six feet from each other, and are connected and secured by others laid lengthwise, and bound tight. Over the whole of this frame-work a net is thrown, which is made fast to a reed fence at the entrance, extending nine or ten yards up the ditch; beyond this it is pegged strongly to the ground. At the end of the pipe farthest from the entrance, a *tunnel-net* is fixed; this is about four yards in length, cylindrical in figure, and kept open by hoops of about eighteen inches in diameter placed at small distances from each other, forming a frame-work. Now supposing the semicircular bend of the *pipe* to be to the right as a person stands with his back to the lake, then on the left-hand side a number of reed screens or fences are constructed (called *shootings*), for the purpose of shielding the decoyman from observation, in order that the fowl entering the decoy may not be alarmed while he is driving those that are in the pipe. These *shootings* are ten in number, about four yards in length and six feet high. From the end of the last *shooting* a person cannot see the lake, owing to the bend of the *pipe*, and there is then no farther occasion for concealment. Were it not for these *shootings*, the fowl that remain about the mouth of the *pipe* would be alarmed if the person driving those already under the net, should be exposed, and would become so shy as at once to forsake the place.

The first thing the decoy-man does when he approaches the *pipe*, is to take a piece of lighted turf or peat and hold it near his mouth, to prevent the birds from smelling him. He is attended by a dog, trained for the purpose of rendering him assistance. He walks very silently about half-way up the *shootings*, peeping through an aperture made by a wooden peg, in the reed fence, to see if any birds are in the decoy; if not, he walks forward to see if any are about the entrance of the *pipe*. If wild-fowl are there, he stops, beckons to his dog, gives him a piece of cheese or something else to eat, by way of encouragement, whereupon the animal goes directly through a hole in the reed fence, and alarms the birds, taking their *siesta* on the bank, from which they at once plunge into the water. The dog returns along the bank between the reed fences, and regains his master. After further encouragement the sagacious animal repeats his rounds, until the birds are *attracted by his motions* and follow him into the mouth of the *pipe*. This operation is called *working* them. The man now retreats farther back, working the dog at different holes, until the ducks are sufficiently under the net. He then commands his dog to lie down behind the fence, and going himself forward to the end of the *pipe* next the lake, he takes off his hat and gives it a wave between the shooting. All the birds that are under the net can then see him, but none that are in the lake can. The former fly forward, and the man then runs to the next shooting and waves his hat, and so on, driving them along until they come to the tunnel-net, into which they creep. When they are all in the man gives the net a twist, so as to prevent them from getting back, he then removes the net off from the end of the *pipe*, and taking out, one by one, the ducks that are in it, dislocates their necks. The tunnel-net is afterwards affixed again, for the repetition of the process, and in this manner five or six dozen have sometimes have been taken at one drift. When the wind blows directly in or out of the pipes, the fowl seldom work well, especially when it blows into the *pipe*. The reason of this is, that the ducks always prefer swimming against the wind, otherwise the wind, blowing from behind, catches and ruffles their feathers. If many *pipes* are made in the same lake, they are so constructed as to suit different winds, and are worked accordingly. The better to entice the fowl into the *pipe*, hemp-seed is occasionally strewn on the water. The season allowed by act of parliament for taking ducks in this way, is from the latter end of October until February.

Willughby states that formerly, before the young ducks took flight, or while the old ones were in moult and unable to fly, they were driven by men in boats, furnished with long poles with

which they splashed the water, between long nets stretched vertically across the pools in the shape of two sides of a triangle, into lesser nets placed at the point, and in this way he says that 4,000 were taken at one drive in Deeping fen; and Latham has recorded an instance in which 2,646 were taken in two days, near Spalding in Lincolnshire; but these practices being considered injurious, were prohibited by statute in the reign of George the Second.

Tame ducks are in many instances used for the purpose of leading the way into the *pipe*. Hence the term *decoy-duck*. These birds are fed on the pond, are made quite tame and familiar, and come to the keeper's whistle to eat the hemp-seed which he strews on the pond. They generally lead the way into the *pipe* when whistled to. As they are used to the sight of the keeper, they do not rush forward with the wild birds into the *tunnel-net*, but return back again, safe, into the pond; should any of them, however, enter with the wild ducks into the *tunnel-net*, they are easily distinguished by the keeper, who well knows them, and are set at liberty to continue their practice.

Domestication has modified the habits of the tame duck. In a state of nature, for example, the duck pairs with a single mate; the pairing time is about the end of February or early in March, and the two continue associated together until the female begins to sit. At this juncture the male deserts her, and joins others of his own sex similarly circumstanced, forming small flocks, which may be seen, at the latter part of May and in June, without a female amongst them. At this time, moreover, the male begins to lose his rich attire, assuming in a great measure the colours of the female, which he retains until the general or autumnal moult gives him new livery. The tame duck is polygamous, nor does the drake undergo so decided a change of plumage; his colours may become duller till the autumnal moult renews their beauty, but this is all.

The wild duck makes a nest of withered herbage in some dry and secluded spot amidst the marshes, under the covert of a bush, a thick tuft of rushes, or intertangled vegetation, and lays from ten to fourteen bluish white eggs. Strange spots, however, are sometimes chosen as the site of the nest. Many instances are on record of the nest being built on the fork of a large tree; we have known it situated on the top of an old willow pollard, and Mr. Selby knew an instance in which, near his own residence, a wild duck laid her eggs in the deserted nest of a crow, at least thirty feet from the ground. In these instances, as Mr. Selby suggests, the young are carried to the ground in the bill of the parent, a mode of conveyance, he says, "known to be frequently adopted by the

eider duck." Like the lapwing and the part-ridge, and many other birds, the wild duck has recourse to artifice in order to draw an intruder from her nest, or from her brood of young concealed in some brake or jungle of rushes. She pretends lameness, flies with apparent difficulty a few feet before the intruder, as if unable to escape if he vigorously pursue, and thus she leads him about until he is far from her nest, when up she springs, to his utter astonishment. This care is even bestowed on the eggs; the wild duck never leaves her nest without covering it with down and dried grass, so as to screen them most effectually from the sight of crows, ravens, and other marauders. The drake or mallard has a large osseous *bullæ* or drum, at the lower extremity of the trachea, which is equal in its diameter throughout. The plumage of the wild duck, male and female, is too well known to need description.

From the wild duck, let us turn to its domesticated descendant. It is not in all situations that ducks can be kept with advantage, they require water much more even than the goose, they are no grazers, yet they are hearty feeders, and excellent "snappers up of unconsidered trifles:" nothing comes amiss to them—green vegetables, especially when boiled, the rejectamenta of the kitchen, meal of all sorts made into a paste, grains, bread, oatcake, animal substances, worms, slugs, and crushed snails, insects and their larvæ, are all accepted with eagerness. Their appetite is not fastidious; in fact, to parody the line of a song, "they eat all that is luscious, eat all that they can," and seem to be determined to reward their owner by keeping themselves in first rate condition if the chance of so doing is afforded them. They never need cramming—give them enough, and they will cram themselves; yet they have their requirements, and ways of their own, which must be conceded. Confinement will not do for them; a paddock, an orchard, a green lane, and a pond; a farm yard, with barns, and water, a common, such as Barnes Common, smooth and level, with a sheet of water, and nice ditches abounding in the season with tadpoles and the larvæ of aquatic insects, these are the localities in which the duck delights, and in such are they kept at little expense. They traverse the green sward in Indian-file (an instinctive habit still retained), and thus return at evening to their dormitory, or emerge from it to the edge of the pond or sheet of water over which they scatter themselves; thus also they come to the call of their feeder. Ducks should always have a lodging-place of their own, they should be separate from fowls, and never housed beneath their perches; yet where fowls are kept, a little contrivance will suffice to make their berth, even in

a fowl-house, tolerably comfortable. In winter a thin bedding of straw, rushes, or fern-leaves should be placed on the floor of their dormitory, and changed frequently. More than four or five females should not be allowed to a single drake; the wild duck, as we have said, is monogamous, and this should not be forgotten. The duck lays on the average from twelve to twenty eggs in the season; there are, however, instances in which a duck has laid as many as eighty-five eggs, but these cases are rare. The female will cover with comfort twelve or fourteen, and in most cases is a steady sitter. It is, however, very common to put ducks' eggs under hens, and it is ludicrous, though somewhat painful, to see the trepidation and anxiety of the foster mother on the edge of a pond, into which the young ducks have plunged regardless of her feelings and incessant clucking, a language they do not understand. At what age young wild ducks are introduced by their parents into the water we cannot precisely say, but this is certain, that if young tame ducks visit the water too early, they are apt to become cramped, and then perish; indeed, while visiting Mr. Cantelo's hatching establishment, near Turnham Green, we were assured that if young ducklings become once saturated with water, they invariably perish, and are in this respect as tender as young turkeys. Ducks, although they float on the water, never become wet (that is when properly fledged), for their plumage throws off the fluid, and they return as dry (legs excepted) from the pond as they were before they entered it. Young ducks are easily reared, being fed on meal mixed with potatoes and green meat boiled; they are useful in gardens, which they clear of slugs and snails, without injuring the crops of vegetables. As a caution we would here observe that the ponds to which they are allowed access should contain neither pike nor eels; and rats should be extirpated from the same places. Rats and weasels often thin flocks of ducklings, to the loss and vexation of their owner.

The domestic duck varies greatly in size and colouring; the white Aylesbury breed is much in request, this indeed is the breed which prevails over Buckinghamshire generally, where many families derive a considerable portion of their subsistence by rearing these birds for the market. Those hatched in the early part of the season may be said to be brought up by hand. The interior of the cottages of those persons who follow this occupation presents a curious appearance to the stranger, "being furnished with boxes, pens, &c., arranged round the walls for the protection of the tender charge of the good-wife, whose time and attention are taken up with this branch of domestic economy."—(Mowbray). The Rhone duck, a large dark-coloured variety, is also highly esteemed,

and a cross breed between this and the Aylesbury is said to be superior in flavour to all others. Ducks are abundant in France, and very fine, especially, as we have seen, in Normandy, Picardy, Brittany, and Languedoc. The duck-liver pies of Toulouse, in the province last named, are almost as celebrated as the goose-liver pies of Strasburg. The practice of nailing these birds to a board, placing them before a fire, supplying them with food and water, and keeping them in this horrible situation until the liver becomes morbidly swollen, is of great antiquity; it appears to have been practised by the Romans, but nothing can excuse such detestable barbarity. Let the epicure who luxuriates upon *pâté de fois gras*, ask himself if he would like to initiate his children in such a mode of treatment to defenceless animals; if he can answer "Yes!" he will relish his *pâté*.

Among the curious but useless and unpleasing varieties of the domestic duck which we have seen, may be mentioned the hook-billed duck (*Anas adunca* var., Liu.; *Anas rostro incurvo*, Brisson), remarkable for the preternatural distortion of its beak; and also the penguin duck, which walks, or rather waddles, in an upright position like the penguin, owing to the unnatural position of its legs. Such varieties are of no value; they are the result of accidental malformation transmitted from generation to generation.

We have noticed the artificial incubation of the eggs of fowls in Egypt; the same thing occurs with ducks' eggs in China. The rearing of ducks as well as pigs in China is a matter of considerable importance. Thousands of ducks are hatched by artificial warmth, the eggs being laid in boxes of sand, which are placed on a brick hearth, a proper temperature being maintained around them, until the ducklings emerge from their shells. The ducklings, it is said, are at first fed with cray fish and crabs boiled and cut small, and afterwards mixed with boiled rice. In about a fortnight they are able to shift for themselves; they are then provided with an old stepmother, who leads them where they are to find provender, being first put on board a sampan or boat which is destined for their habitation, and from which the whole flock, 300 or 400 in number, go out to feed and return at command. This method is used nine months out of the twelve, for in the colder months it does not succeed, and is so far from a novelty that it may be seen everywhere, more especially about the time of cutting the rice, when the masters of the duck-boats row up and down the rivers, according to the opportunity of procuring food, which during that season is found in plenty at the ebb of the tide on the rice plantations which are overflowed at high water. It is curious to see how the ducks obey their master, for some thousands belonging to different boats

will feed upon the same spot, and on a signal given follow the leader to their respective boats, without a stranger being found among them. The communication between the bank and the boat is by means of a narrow plank, and a gentleman of our acquaintance, long resident in China, has informed us that the first duck which gains the boat is ordinarily rewarded with a handful of rice, but that the last undergoes a smart chastisement. Of this discipline, the birds become from its repetition soon aware, hence each strives to be foremost; one unfortunate must of course be the last, and undergo its punishment.

Among the ancient Egyptians ducks were in great request, and Herodotus informs us that they were eaten salted, without any other preparation.

"Goose and duck painting seems to have been a favourite subject among the Egyptians. In Rosellini's plates (No. iv. M.C.) there is a picture from a tomb at Thebes which represents a continuous subject; it lies in one compartment, and is read from right to left. On the extreme right four men are pulling a long rope attached to a net, in which a number of birds, apparently ducks, are caught upon a lake or some water; a fifth man, a little in advance of the four, has also hold of the rope, and seems to be giving a signal to the rest, while a man hid among some plants (*papyri*?) appears to be giving a signal and recommending care and silence. Farther on to the left are two men carrying the ducks on their shoulders, and a little farther a man putting them into earthen vessels, formed like Roman *amphoræ*, after the feathers have been plucked and the legs cut off, the heads of the ducks were kept on, and in this state they seem to have been put into the *amphoræ*, probably containing salt or pickle. In the extreme left of the picture two men are seated, one of whom seems as if he were rubbing something into a duck; one hand is closed as it would be if it were full of salt, and with the other he is raising one of the wings, apparently for the purpose of rubbing in the salt. The other figure appears to us to be plucking the feathers off the neck of a duck, but Rosellini describes him as sprinkling a handful of salt upon it. These two seated figures are placed near a frame-work, formed by two upright poles and a third placed across. From this cross-pole, the geese which are plucked and ready for the *amphoræ* are suspended by the neck. This painting, according to Rosellini, is on the tomb of a royal scribe called Titi, who exercised his art in the reigns of Thutmes IV. and of Ameno II., in the beginning of the eighteenth century before the Christian Era, and hence, if Rosellini's interpretation of the inscriptions is right, the picture is 3,600 years old."—*Egyptian Antiquities*. In other delineations, ponds in gardens,

with tame ducks, geese, and fishes, surrounded by fruit trees, are presented. It is somewhat remarkable that, esteemed as the duck was in ancient Egypt, neither this bird in a tame state, nor the goose, though wild fowl are abundant, is to be seen as of ordinary occurrence in the villages; the same observation applies to Syria, and also to Persia, and Western Asia in general. These aquatic birds are rarely eaten by the Moslems, and, as there is every reason to believe, were rejected by the ancient Hebrews. The wild duck abounds in Syria and other parts of Western Asia, where marshes and lakes afford it a congenial habitation. Wild fowl swarm on the lake of Tiberias.

The Musk Duck, erroneously called the Muscovy duck (*Carina moschata*, Fleming).



THE MUSK DUCK.

The musk duck, so termed from the strong scent of musk which its skin exhales, is undoubtedly the type of a genus very distinct from that of the common duck. In this species the feathers are large, lax, and powdery, the cheeks are extensively naked, and the base of the bill is carunculated. This duck greatly exceeds the ordinary kind in size, and the male is far larger than the female. The general colour is glossy blue black, varied more or less with white, the head is crested, and a scarlet fleshy space surrounds the eye, continued from scarlet caruncles at the base of the beak. Tail destitute of the curled feathers so conspicuous in the tail of the common drake.

The species is well known in a domestic condition, not only in our own island but throughout Europe generally. According to Buffon, these birds were introduced into France in the time of Belon (about 1540). The latter author calls them *canes de Guinée*, a circumstance which proves that their original country was then not correctly ascertained. The species was known to Ray, who terms it *anas sylvestris Braziliensis*, the wood duck of Brazil. Linnæus, who was well acquainted with the original country, and gave it the appellation of *anas moschata*, says in his *Fauna Suecica*, it is reared on the farms of the gentry, but is not indigenous in Sweden—"In prædiis magnatum culta; nullibi Sueciæ spontanea." Marcgrave, who describes the musk duck as black with white

shoulders, terms it "*anas sylvestris, magnitudine anseris*" a woodland duck, as large as a goose; he observes that it is common in Brazil, Guiana, and Paraguay. Latham informs us that this bird is called *patas* in Brazil, where it is sometimes seen in vast flocks; he also adds that the Guaranis call it *upeguazo* (great duck), and the Spaniards *pato real o'grande* (greater royal duck). In Paraguay it is seen either in pairs, or in flocks of twenty or thirty, which roost together on high trees; the female lays in September from ten to fourteen eggs in the hollow of a tree on a bed of feathers from the breast of the male. After stating that this bird has multiplied in our menageries, the same ornithologist adds, "said to be in a wild state about the Lake Baikal in Asia." This we suspect to be a mistake; if not, we may not unreasonably conjecture that these wild musk ducks of Lake Baikal are the descendants of individuals which have emancipated themselves, and have made that noted haunt of wild-fowl their abode. For ourselves, we have never been able to ascertain the fact, nor have we ever observed a single specimen of the musk duck in any collection of birds obtained in Asia; indeed we have never seen the specimen of a true wild musk duck at all. Mr. Eyeton, in his valuable work on the duck tribe, states that these birds "are supposed to be originally natives of South America," an expression which evidently implies that he has not been able to verify the original locality of the species. There can, however, be little doubt on this point. Buffon, who states that it is the *ypeca-guaçu* of Pison, adds that in Guiana it is said to tenant the flooded savannahs, and to build its nest on the trunks of decayed trees; when the young are hatched, the parent, as is asserted, carries them one after another in her beak to the water. They are there, as it would appear, liable to destruction from alligators, for flocks of young are seldom seen exceeding five or six in number, though the eggs are more numerous. Their food in the savannahs consists of the grain of a sort of grass called wild rice. In the morning they visit the immense inundated prairies, and fly towards the sea as the evening comes on; but the hottest hours of the day are passed on the leafy branches of trees. They are fierce and wild, and will not allow themselves to be approached. (See Buffon.)

We might collect the notices of various authorities as to the general habits and original country of this species, but all accounts are in the main details consonant with each other.

With respect to the domestic bird, it requires the same treatment as the ordinary duck, with which it will interbreed, but we believe the hybrids to be unfertile. The male greatly exceeds the female in size, and is quarrelsome and irascible; when excited it depresses its head, and utters deep

hoarse notes in the lowest tone; the flesh is good, as is also that of the hybrids; the eggs are rounder than those of the common duck, and frequently incline to a greenish tint.

The windpipe of the male is stout, nearly equal in diameter, but somewhat smaller towards the bottom; the bony drum, or labyrinth, as in others, is attached to the lower part of the windpipe (*trachea*), just within the chest. This drum is not smooth on the surface, as in the pintail and widgeon, but universally rough and irregularly furrowed with fine indented lines; the opposite side of a pear shape, and placed obliquely, with the point lowest, but is flattened considerably on the surface; the bony arch is on this side smooth, having no appearance of rings, and is bent at a small angle from the trachea, though it constitutes a continuance of it. In old birds the bony labyrinth is more rounded and larger, but still retains the roughness on the surface; in a very old subject the labyrinth was not only much larger but nearly globular, and the texture more bony; that figured by Dr. Bloch, in the *Berlin Trans.* iv., p. 113, pl. xvi., figs. 5 and 6, appears by much too large; but supposing the musk duck to arrive at twice the size of those in England, and which they are said to do, no doubt the labyrinth and trachea would be in due proportion. (See Latham's *Ornithology*.)

SUBFAMILY CYGNINA, SWANS.

We might omit without blame, in a work like the present, all notice of the Swan; nor shall we take up much time or space in expatiating upon that semi-domesticated ornament of our rivers and sheets of water. Our Tame Swan (*Cygnus olor*) is not an aboriginal of our island, but is an imported and naturalised species. We may observe that the family *Cygnina* has a very wide distribution, more especially throughout the colder latitudes. As a rule all are migratory, passing southwards in winter, and returning to the lonely breeding places of the north as spring approaches. We may enumerate the species as follows:—

EUROPE and ASIA.—The Wild Swan, Hooper, or Whistling Swan (*Cygnus ferus*. Ray; *C. musicus*, Bechstein). Migratory. Breeding localities, the northern regions of Europe and Asia; extends its winter journeys to Southern Europe, Barbary, and Egypt.

Bewick's Swan (*Cygnus Bewickii*, Yarrell, in *Trans. Linn. Soc.*) Localities, north of Europe and Asia; migrates southwards in winter, and occasionally visits our island. (For a detailed account of the differences in the convolutions of the trachea in these two species, see Yarrell, in *Linn. Trans.*, Selby's *Brit. Ornithol.*, Yarrell's *Brit. Birds*.)

The Polish Swan (*Cygnus immutabilis*, Yarrell,

in *Proceed. Zool. Soc.*, 1838, p. 19, and *Brit. Birds*). Locality, the regions of the Baltic; in winter occasionally visits England.

The Mute Swan (*Cygnus olor*). Localities, Siberia, North-eastern Europe, and the adjacent parts of Asia; visits the Caspian sea, Asia Minor, and Mesopotamia, in winter. This is our domestic species.

NORTH AMERICA.—The Wild Swan (*Cygnus Americanus*, Sharpless and Audubon). Locality, the northern regions; a representative of *Cygnus ferus*.

The Trumpeter Swan (*Cygnus buccinator*, Richardson and Audubon). Locality, the northern regions; a representative of *Cygnus Bewickii*.

SOUTH AMERICA.—*Cygnus anatoides*, King. Locality, the Straits of Magellan. *Proceed. Zool. Soc.*, 1830, p. 15.

The Black-necked Swan (*Cygnus nigricollis*, Steph.) Locality, Chili.

AUSTRALIA.—The Black Swan (*Cygnus atratus*, *Anas Plutonia*, Shaw; gen. *Chenopsis*, Wagler). Locality, Van Dieman's Land, New South Wales, west coast of New Holland.

It is with the *Cygnus olor*, only, that we have immediate concern at present, and this species is too well known to require a detailed description. The trachea has nothing of the looped and complicated structure found in that of the hooper; it is even more simple than the trachea of the black swan of Australia. The large tubercle, or berry, as the swan-herds term it, at the base of the bill, at once distinguishes this species from any of its congeners.



THE COMMON SWAN.

The swan is said in England to be a royal bird, "in which no subject can have property when at large in a public river or creek, except by grant from the Crown. In creating this privilege, the Crown grants a swan-mark (cygniota) for a game of swans, called in law-Latin *deductus* (a pastime, un déduit) *cygnorum*, sometimes *volatus cygnorum*

(7 Coke's *Rep.* 17). In Scotland, the swan is said not to be a royal bird (Erskine's *Instit.*, b. ii., tit. 6), but whilst all proprietors in that country have the right of fowling within their own grounds, swans, unless specially granted, appear to be reserved to the Crown (Stair's *Instit.*, b. ii., t. 3, s. 60; and see Ducange, *Cygnos habendi jus*). In the reign of Elizabeth, upwards of 900 corporations and individuals had their distinctive swan-marks, some of which may be seen in Yarrell's *British Birds*, vol. iii."

An admirable summary of the laws relative to swans may be seen under the head of SWAN in the *Penny Cyclopædia*. As this article is too long for insertion here, and as we do not profess to understand the subject (for we know little of the feudal laws, and less of their modifications through successive reigns), we prefer giving our curious readers a reference to the paper in question. See also Yarrell's *British Birds*, Blomfield's *Norfolk*, Kemp's *Losely MSS.*, *Archæologia*, vol. xvi., Col. Hawker, and others.

The male swan is popularly termed the *cob*; the female swan, the *pen bird*. The male and female mate in pairs, and the male encourages and defends the female while brooding over her eggs. On passing up the river Thames in spring, from Battersea to Richmond or Hampton Court, and still higher, various stations on the banks and willow-eyots may be observed, in which large swans' nests, elevated above the highest rise of the tide, are conspicuous, and on which the female may be seen incubating. These nests are built for the birds in their favourite spots; the eggs are from about five to seven in number, and the period of incubation is six weeks.

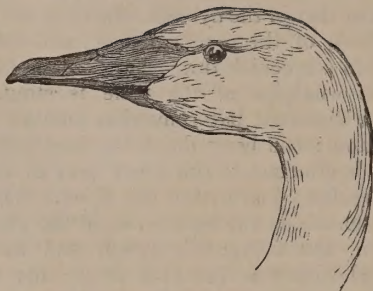
The young are termed *cygnets*. They are at first clothed with a grayish brown down; this colour is not entirely lost until the beginning of the third year. During the summer and autumn, and perhaps through a great part of the winter, the cygnets follow their parents and are under their guidance.

The food of the swan consists of aquatic plants and their roots, grain, and, probably, of aquatic larvæ, small mollusks, &c., for the procuring of which, at a considerable depth, their long neck gives them peculiar facilities.

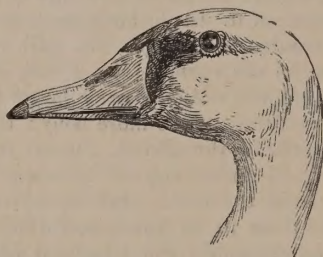
We give an outline of the heads of our four European swans, which will at once show their distinctness from each other.

In the *Magazine of Natural History* for 1839, p. 175, will be found an excellent paper by Mr. Pelerin, on the osteological and other differences between the Polish and the mute swan. The Polish swan will breed freely in captivity; its young are white, the feet are slate gray, the tubercle on the beak, even in old males, is of small size.

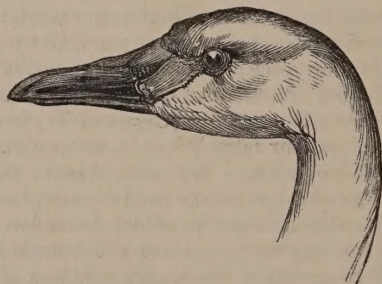
The hooper, as well as the Polish swan, will breed in confinement on a pond or sheet of water.



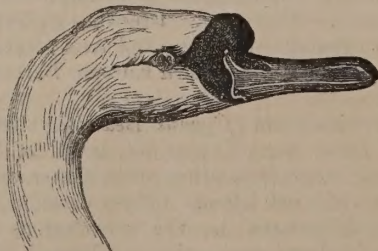
HEAD OF HOOPER SWAN.



HEAD OF POLISH SWAN.



HEAD OF BEWICK'S SWAN



HEAD OF MUTE SWAN.

It is most probably this species which was celebrated by the ancients for its dying song. Its wild note resembles the word "hoop" uttered several times successively, and when heard proceeding from a large flock flying high over head, mellowed by distance, is far from being unmusical. We have alluded to the convolutions of the trachea of this species.

The flesh of all the swans when the birds are young is of good quality. Formerly, it was in high estimation; at present, as far as we can learn, it is only occasionally served at public banquets, swans being kept rather as ornaments, and in the continuation of ancient rights and customs, on our rivers and sheets of water, than for the sake of their flesh. All the species become rapidly very tame and familiar, feeding from the hand.

SUBFAMILY ANSERINÆ, GEESE.

The Geese, a tribe of great utility to man, are united by several intermediate forms to the swans, so that it is difficult to determine, occupying as they do a sort of debateable ground, whether they should be referred to the group of swans (which we have merely touched upon), or to the present subfamily. Indeed some naturalists, whose opinion is of weight, refer these intermediate forms to the former rather than the latter, and, but that cross breeds between them and the common goose have come under our notice, we should be strongly tempted to adopt their arrangement. On the other hand, there are certain forms of the *anatina* so elevated on the limbs, and so terrestrial in their habits, that they seem to connect the true geese with some groups among the waders (order *Grallatores*). As we are not writing for zoologists, these are points which we shall not moot. It is sufficient to have hinted at them, and the rather that two of the domesticated species to be noticed are swan-geese; and that a third tends towards the waders. Let us commence with the swan-geese, then treat of our ordinary species, and conclude with that which has most affinity with the waders.

CANADA GOOSE, or CRAVAT GOOSE (*Anser Canadensis*), *Neeseah* and *Mistehayneeseah* of the Cree Indian, *Wild Goose* of the Anglo-Americans.—Hearne, Wilson, Audubon, Bonaparte, and others have given us full accounts of the habits and manners of the Canada goose in a state of nature. It is the common wild goose of the United States, and its regular periodical migrations are the sure signals of returning spring, or of approaching winter. The tracts of their vast migratory journeys are not confined to the sea-coast or its vicinity, for in their aerial voyages to and from the north, these birds pass over the interior on both sides of the mountains, as far west at least as the Osage river. "I have never," says Wilson, "yet visited any quarter of the country

where the inhabitants are not familiarly acquainted with the regular passing and repassing of the wild geese." It is an opinion in the States that they visit the lakes to breed. Most, however, it would appear, wing their way much farther northward, for from the Canadian lakes they migrate to still higher latitudes on the setting in of spring. Hearne saw them in large flocks within the Arctic circle, pushing their way still northward. Captain Phipps observed them on the coast of Spitzbergen in lat. 80° 27' N. Audubon found them breeding on the coast of Labrador, and states that the eggs, six or seven in number, of a greenish white, are deposited in a roughly made nest. Bonaparte states that it breeds everywhere throughout the Hudson's Bay Territory, and has been observed in the middle of July on the Coppermine river, not far from its debouchure, accompanied by its newly hatched young. The cry of this species is imitated by a nasal repetition of the syllable *wook*, or, as Wilson writes it, *honk*.

The destruction of the Canada geese during their migrations is enormous; the autumnal flight lasts from the middle of August to the middle of October, those which are taken in this season, when the frosts begin, are preserved in their feathers, and left to be frozen for the fresh provisions of the winter stock. The feathers constitute an article of commerce, and are sent to England. The vernal flight of these geese lasts from the middle of April until the middle of May. Their arrival in the fur countries from the south is impatiently expected; it is the harbinger of spring, and the month is named by the Indians the goose moon. Dr. Richardson, in his *Fauna Boreali-Americana*, describes, as follows, the interest caused by the appearance of the flocks in the fur countries:—"The arrival of this well known bird in the fur countries is anxiously looked for and hailed with great joy by the natives of the woody and swampy districts, who depend principally on it for subsistence during the summer. It makes its first appearance in flocks of twenty or thirty, which are readily decoyed within gunshot by the hunters, who conceal themselves and imitate its call. Two, three, or more are so frequently killed at a shot, that the usual price of a goose is a single charge of ammunition. One goose, which when fat weighs about nine pounds, is the daily ration of one of the Company's servants during the season, and is reckoned equivalent to two snow-geese (*Anas hyperborea*) or three ducks, or eight pounds of buffalo or moose-meat, or two pounds of pemmican, or a pint of maize, and four ounces of suet.

"About three weeks after their first appearance the Canada geese disperse in pairs throughout the country, between the 50th and 67th parallels, to breed, retiring at the same time from the shores

of Hudson's Bay. They are seldom or never seen on the coasts of the Arctic sea. In July, after the young birds are hatched, the parents moult, and vast numbers are killed in the rivers and lakes, when (from the loss of their quill feathers) they are unable to fly. When chased by a canoe, and obliged to dive frequently, they soon become fatigued, and make for the shore with the intention of hiding themselves, but as they are not fleet they fall an easy prey to their pursuers. In the autumn they again assemble in flocks on the shores of Hudson's Bay for three weeks or a month previous to their departure southwards."

The Canada goose feeds on aquatic vegetables and their roots, and delicate marine plants of the genus *ulva*. To this diet, they add grain and berries in their season.

The flight of this species is laborious and heavy, and generally in single file, or in the form of two sides of a triangle, the leader, some old gander, being the *apical* bird. From time to time this leader utters his deep "*honk*," which is responded to by the rest of the flock, and which may be translated "What cheer, ho!" "All's well!" Very often, however, all is not well, for the line is scattered by the withering fire of the gunner; often, too, they meet with dense fogs in which they become bewildered, and after wheeling about alight on the ground, where the gunners give them a warm reception. In some districts the sportsmen take with them into the marshes one or two of the domesticated race, which by their call attract the flocks passing over head, and allure them to destruction.

Wilson says, that, except in calm weather, the flocks of Canada geese rarely sleep on the water, generally preferring to roost all night in the marshes. When the shallow bays are frozen, they seek the mouths of inlets near the sea, occasionally visiting the air-holes in the ice; but these bays are seldom so completely frozen as to prevent them feeding on the bars at the entrance.

The Canada goose is a beautiful species, and its flesh is excellent. The head, two-thirds of the neck, the greater quills, the rump, and tail, are pitch-black; the back and wings brocoli-brown edged with wood-brown; the base of the neck anteriorly, and the under plumage generally, brownish-gray; a few white feathers are scattered about the eye, and a white cravat of a kidney shape forms a conspicuous mark on the throat; upper and under tail coverts pure white; bill and feet black. Such is a brief sketch of the Canada goose in a state of nature. Man, however, has appreciated its value, and it is kept domesticated not only in America, but in many parts of Europe, where it breeds freely. In America the ordinary gray goose of Europe is very common; this indeed we

need scarcely say, yet this bird does not thrive there so well as in Europe, hence many prefer the Canada goose, which is equally familiar, and in other respects its equal.



CANADA GOOSE.

This species, as we have said, will breed with the common goose, and it is asserted that the hybrid progeny is far superior in the flavour and sapidity of its flesh to the unmixed progeny of the common goose. Buffon, in whose time the Canada goose was kept in a domestic state in France, says, "Within these few years many hundreds have inhabited the great canal at Versailles, where they breed familiarly with the swans." That is, we suppose, interbreed with the swans, an instance of which has not come under our own notice; the intermediate position, however, of this species renders the fact very probable.

Like the duck and the common goose, the Canada goose under domestication ceases to be as strictly monogamous as it is in its wild state; a circumstance which, in our tame *anatidæ*, results from the plan of keeping but few males, and these in association with a flock of females, so that the ordinary results of pairing—that is, retirement from the rest to a secluded spot, which the mated pair exclusively occupy—are interfered with. Yet, as may be seen in the instance of the common goose, the male generally attaches himself to a particular female, while she is followed by her brood of goslings over the common, and is energetic in their defence. The instinct is not quite obliterated, there is a reigning sultana.

We could wish to see the Canada goose more extensively kept by farmers in our country than it is at present; it is common as an *ornament* to sheets of water in parks, gardens, and pleasure-grounds, but is too much neglected as a bird of *utility*; it is alike valuable for flesh and feathers, at the same time it is not so decided a grazer as is the common goose; the precincts of marshes and ponds which abound in aquatic vegetation, for the

procuring of which its strong bill and long swan-like neck afford it facility, offer the most advantageous sites for its establishment, and in such localities we strongly recommend its adoption. With regard to its management little is to be said; the sitting females require secluded nests free from intrusion, and the flock, in addition to the vegetables they pick up, require an allowance of grain. Like most birds known both in a wild and domestic state, the latter exceed the former in weight and magnitude.

The facility with which the Canada goose, captured wild, is tamed, while yet it retains a "trick of the old nature," is well exemplified in a story related by Wilson, on the authority of a correspondent for whose veracity he avouches; which story, he observes, is paralleled by others of the same import. "Mr. Platt, a respectable farmer on Long Island, being out shooting in one of the bays which, in that part of the country, abound with waterfowl, wounded a wild goose. Being wing-tipped and unable to fly, he caught it and brought it home alive. It proved to be a female, and turning it into his yard with a flock of tame geese, it soon became quite tame and familiar, and in a little time its wounded wing entirely healed. In the following spring, when the wild geese emigrate to the northward, a flock passed over Mr. Platt's barn-yard, and just at that moment their leader happening to sound his bugle-note, our goose, in whom its new habits and enjoyments had not quite extinguished the love of liberty, remembering the well-known sound, spread its wings, moved in the air, joined the travellers, and soon disappeared. In the succeeding autumn the wild geese, as was usual, returned from the northward in great numbers to pass the winter in our bays and rivers. Mr. Platt happened to be standing in his yard when a flock passed directly over his barn. At that instant he observed three geese detach themselves from the rest, and, after wheeling round several times, alight in the middle of the yard. Imagine his surprise and pleasure, when by certain well-remembered signs he recognised in one of the three his long-lost fugitive. It was she indeed! She had travelled many hundred miles to the lakes, had there hatched and reared her offspring, and had now returned with her little family to share with them the sweets of civil life.

"The truth of the foregoing relation can be attested by many respectable people, to whom Mr. Platt has related the circumstances as above detailed. The birds were all living and in his possession about a year ago, and had shown no disposition whatever to leave him." We have been told of tame ducks (females) emancipating themselves, interbreeding with wild drakes, and bringing their brood back to the old familiar home.

Such an instance has never come under our own knowledge, but we can believe it possible.

Let us now pass to the sketch of another swan-goose:—

The CHINESE SWAN-GOOSE, or CHINESE GOOSE (*Anser cygnoides*, *Anser Guiniensis*, Brisson; *L'oie de Guinée*, Buffon).

This noble species in its wild state appears to be very extensively spread. It is a native of China and other parts of Asia, and also of Africa, as is asserted, although we have never seen specimens in any collection either from the western or southern portions of the latter quarter of the globe; we suspect the species to be chiefly confined to the central and oriental portions of Asia. Of its habits in a wild state nothing is known, yet that it is domesticated with the utmost facility we have abundant proof, for it has been long reared in ponds, and on the fresh-water sheets of pleasure-grounds, in our island, as an ornament. At one time several living specimens graced the gardens of the Zoological Society, of which some were brought direct from China. In general form, in length of neck, and in the protuberance at the base of the beak, these birds remind us of the swan, but their gait is more goose-like, and they interbreed freely with the ordinary goose, though we believe the offspring are not fertile, at least among themselves. We have not unfrequently seen this species in farm-yards, as well as broods of mixed origin; and it has often forcibly occurred to us that so fine a bird, intermediate in size between the goose and swan, has not received the attention generally which it merits; we have, as already stated, seen it or a mixed breed in farm-yards, but still it is not common.

The Chinese goose in domestication varies in colour; its description is as follows:—Bill orange, with a blackish or darkish coloured protuberance surmounting the base of the upper mandible, and a feathered wattle under the throat; a dark brown stripe runs down the hinder part of the neck from the head to the back; the fore-part of the neck and breast are yellowish gray; the back and all the upper parts are grayish brown; abdomen white; legs orange.

Variety A, with the bill and legs black. Variety B, plumage white, with a pale brown mark down the back of the neck, vanishing at the lower part.

We have but few observations to make on this species. Like the Canada goose, it is far less adapted for grazing than the common goose; nevertheless, it may be reared in farm-yards without trouble. Colonel Montagu relates a singular instance in which a Chinese goose attached herself to a pointer dog. This pointer, not the mildest of his race, one day killed the male bird of the pair, and was not only smartly punished



THE CHINESE GOOSE.

for his offence, but was obliged to submit to the indignity of having the dead body of the bird tied to his neck. The solitary goose became extremely distressed for the loss of her partner and only companion, and seeing him attached to the neck of the miscreant dog, who was confined to the kennel, was thereby, as it would appear, attracted to the spot, and seemed determined to persecute the dog by her incessant attendance and vociferations. Thus things went on, till by degrees the bird's lamentations not only ceased, but, as the asperities of the hardest stones are rubbed down by attrition till the opposing sides fit together, a strange friendship, if such a term be allowed, the result of habit, took place between these previous enemies and ill-assorted animals. They fed out of the same trough, lived under the same roof, and kept each other warm on the same bed of straw. When the dog was taken to the field, the lamentations of the goose were incessant till his return.

We find this species noticed in the Catalogue of the birds lately exhibited in the Chinese Museum opposite Hyde Park, as *Cygnopsis cygnoides*. See Mr. Strickland in *Proceeds. Zool. Soc.*, 1842, p. 166. Its generic distinction from the true geese, as that also of the Canada goose, which Cuvier says "me parait un vrai cigne," cannot be contested.

These birds, we say, are swan-geese—that is, they are not true swans nor yet true geese, but combine in themselves characters referable to both families, and thus form a link uniting the *cygninæ* to the *anatinae*. We might here enlarge upon this point, but we do not forget that we are not now writing for zoologists.

From these intermediate forms we next proceed to the *true geese*, of which the ordinary goose, or rather its wild origin, may be taken as a typical example.

Of the true geese, *anser*, as at present re-

stricted, Europe presents us with the following species:—

1. The GRAY-LAG WILD GOOSE (*Anser palustris*, Fleming; *Anser cinereus*, Meyer).—To be noticed hereafter.

2. The BEAN-GOOSE (*Anser ferus*, Fleming; *Anser segetum*, Steph.)—This is the ordinary wild goose, so well known as a periodical visitant during winter to our shores and morasses. In general appearance and in plumage it closely resembles the gray-lag, from which, however, it may always be distinguished by the form of the bill, and also by its colour. It is shorter, smaller, and more compressed towards the end than in the gray-lag. The basal part of the upper mandible, and that also of the under, together with the nail or dertrum at the tip, being black, while the intermediate part is flesh-red, inclining to orange.

This species breeds in the high northern regions of Europe and Asia. Some, however, it is said, make Harris and the outermost islands of the Hebrides a summer residence, but the main body find their asylum within the Arctic circle. After rearing their broods and moulting, the vast flocks begin their progress southward, and arrive in our island generally in October, and depart in April. The shyness and vigilance of this bird are well known. During the day they frequent wide open upland grounds, and often do much injury to the springing wheat. At night they seek security amidst the marshes, or on some bar along the coast sufficiently distant from the mainland to give them the opportunity of observing the approach of any suspicious object; hence it is only by stratagem that they can be approached within gun-shot. Their flight is high and very rapid, and, as usual, the flocks make their aerial journeys in lines or triangles. For a complete history of this species see Bewick, Yarrell, Selby, and others. We shall only pause to observe, that this species is *not* the origin of the domestic goose.

3. The WHITE-FRONTED GOOSE (*Anser erythropus*, Fleming; *Anser albifrons*, Bechstein).—This species, like the bean-goose, is a regular winter visitant to our island. It is common alike to Europe, Asia, and North America, and breeds within the Arctic circle, whence the flocks migrate southwards on the approach of winter. In the white-fronted goose the bill is flesh-red tinged with orange, the nail or dertrum being skim-milk white. Not the origin of our domestic race.

4. The PINK-FOOTED GOOSE (*Anser phaenopus*, Bartlett, in *Proceeds. Zool. Soc.*, 1839, p. 3).—A winter visitant to our island, but apparently rare. Allied to the bean-goose, but has the bill shorter, smaller, more contracted towards the tip, and of a different colour; its base, sides, and nail are black, the space between the nail and nostril being reddish flesh or pink. Mr. Bartlett points

out many other distinctive marks between the two species, which need not here detain us. Not the origin of our domestic race.

With the genus *bernicle*, which includes the bernicle-goose, the brent-goose, and others, we have no immediate concern. The genus is entirely distinct from that of the *true geese*.

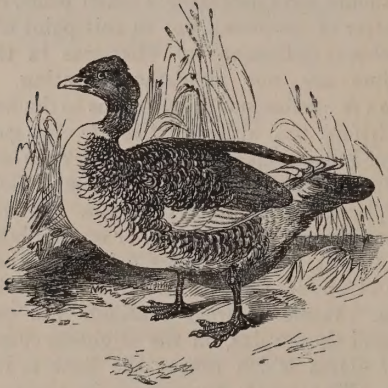
Of the four geese to which we have alluded, three, as stated, are not the originals of our domestic stock; but one is, viz., the gray-lag. Here, then, we revert from this brief digression.

The DOMESTIC GOOSE (*Anser palustris*, Flem.; var. *Domesticus*).—When, or by what people, the goose was reclaimed, it is impossible to say; but that it is a descendant of the gray-lag cannot be doubted. Their essential characters are the same, “no disinclination to breed with each other is evinced between them, and the offspring of wild and domesticated birds are as prolific as their mutual parents.” The gray-lag is not an Arctic bird. Temminck says that it seldom advances beyond the 53rd degree of north latitude. Consequently its migratory movements are on a limited scale, and irregular. Its geographical range extends over the central and eastern parts of Europe, Central Asia, and some parts of Western Africa. Formerly it was abundant in our island as a permanent resident, breeding in the fenny counties, such as Lincolnshire, Cambridgeshire, &c.; but from these seats it has been long banished, together with the stork, the spoonbill, and the crane, and driven to more congenial abodes. Our great marshes and fens of the olden time, in which alone such birds could have found security, have by drainage been gradually circumscribed, and extensive lands, once morasses or under water, are now rich farms devoted to the plough. In feudal England towns and villages were few, small, and far apart; vast districts were left uncultivated and unpopulated. Intestine and foreign wars thinned the island of its population; frequent famines, with accompanying diseases, contributed to the same effect; the mass of the people were serfs or bond slaves; their wholesale destruction was scarcely deemed worth notice by the historian; death, or torture, or fines and imprisonment, were the doom of the unfortunate man who killed beast or bird of chase even by accident. The hunting and the hawking of the prince and noble were paramount in importance to agriculture; nay, as if the country were not sufficiently depopulated for the pleasure of regal and baronial Nimrods, hundreds of acres were cleared of human inhabitants, and given to the deer and the wild boar, and to wild fowl of all kinds, for the gratification of the huntsman and the falconer. But the improvement of agriculture, the advancement of commerce, the increase of human population, all making progress as feudal usages and laws became one after

another obsolete, gradually effected changes, not only on society at large, but on the face of the country in general; and although at first this alteration of things was scarcely perceptible, yet, once begun, it proceeded with increasing momentum, until the face of England assumed a new appearance. Our forests are gone, our parks circumscribed, our marshes drained, so that if the conquering Normans, or, to go back still further, the haughty Cæsar, were (could it be possible) to revisit our island, they would not know the country in which they played their part. That similar changes in the zoology of an island of no great extent should have accordingly taken place, cannot be a matter of surprise; yet in this point of view (as in others) indications of what was in the by-gone time are not altogether wanting. For example (to confine our observations to the humble subject before us), although the gray-lag goose is no longer indigenous, still a few flocks in winter, wandering perhaps from the lakes and fiords of Norway, occasionally pay us a visit, and sojourn for a time among our marshes, or on the lowlands near the coast. These flocks evince all the vigilance and shyness which the *anser*es display in common. While feeding, sentinels are on the watch, and these raise, on the slightest suspicion, a cry of alarm which rouses the flock to instant activity. The same precaution is observed at night; and it was thus, if records speak true, that by the vigilance of this bird the Roman capitol was saved from the assault of the Gauls.

Bartlett's description of this species (*Proceeds. Zool. Soc.*) is very accurate:—“Entire length, 35 inches; extent, 64; from the carpal joint to end of wing, 17½ inches. The plumage more cinereous than in the bean-goose; the shoulders and rump light gray; breast and belly white, sometimes spotted with black; the bill 2½ inches long, more robust, deeper, broader, and with the laminæ much more developed than in the bean-goose; colour a dull yellow, inclining to a flesh tint towards the nail, which is white; in summer the bill assumes a redder tint; legs and feet pale flesh colour; wings, when closed, even with the end of the tail. The young of this species are darker than the adults, but the gray upon the shoulders and rump, the form of the bill, and the colour of the legs and feet, will always distinguish them from the young of any of the other species.” Pennant says that the upper and under tail coverts are pure white; the middle tail feathers dusky tipped with white, the exterior feathers being almost wholly white. Weight of the heaviest about ten pounds. The young when captured, according to the same authority, were often tamed (in his day); they were esteemed most excellent meat, superior to the domestic goose. The old geese which are shot are, he says, plucked

and sold in the market as fine tame ones, and readily bought, the purchaser being deceived by the size, but their flesh is coarse. Towards winter, he adds, they collect in great flocks, and live and feed in the fens. Pennant lived from 1726 to 1798. Great are the changes which have occurred since his time! Then the gray-lag resided, as he says, in the fens the whole year, breeding there, and hatching about eight or nine young; but now even winter visitants are not very common, while the truly migratory bean-goose is abundant throughout winter in appropriate situations.



THE COMMON GOOSE.

From this cursory yet not irrelevant account of the gray-lag goose, let us turn to its domestic relative, which, as is usual, varies much in colour, rather as to the amount of gray on the plumage than as to tint—the white often predominating—some, especially ganders, being wholly of the latter hue.

Extensively spread as the wild goose is and ever has been, we believe that different nations or tribes, either at or about the same time, or from time to time, rendered the young domestic, and that in distant portions of the earth the goose was reclaimed from the wild breed. The same observation applies to the duck. Unlike the fowl and the turkey, they had not to radiate from a certain centre; the same wants everywhere incite to the same attempts, and, *ceteris paribus*, with equal success. Cæsar found the fowl and the goose domesticated in Britain. The fowl must have been an importation, and perhaps a then recent one; the goose was most probably domesticated from young birds, or from old ones captured in nets or traps, indigenes of the island. The Britons had no occasion to receive this bird from other countries—yet in other countries, far and wide, was the goose, long before Cæsar's time, a common domestic bird. From the ancient drawings and sculptured representations of animals we

are led to conclude that, besides ducks and the *vulpanser* or *chenalopeæ*, the ordinary goose was reared by the Egyptians, and that too in considerable abundance. On this point, however, we shall not insist—yet we think that those who will take the trouble to examine the delineations in the British Museum will agree with us. That the goose was common in Greece and Italy, as well as throughout Gaul, is indisputable. It is the *χην* (*chên*) of the Greeks, *hansa* in Sanscrit, *ken* in the modern Coptic (query borrowed from the Greek?), *aser* and also *ganza* in Latin (*gander*, English), *gans*, Teutonic. These words have all one common origin. The ancient British *gwydd*, the English *goose*, the Saxon *gos*, the Italian *oca*, and the French *oie*, are, we suspect, derivable from the same ancient root—to which the French "*oiseau*," and the Italian "*uccello*," appear also to belong. However this may be, setting doubtful etymology aside, the antiquity of the domestic goose is certain. Not only was the reed used as a pen in ancient Egypt, but also the gray-goose quill; indeed, in some of the paintings on the tombs, the feathered pen is distinctly figured in the hands of the writer. The Egyptians wrote in narrow columns, from right to left, beginning at the top on the right, and carrying the next column to the left—reversing our mode.

We have already alluded to the story told by Pliny of the salvation of the Capitol by the cries of the wakeful geese, while the watch-dogs were sleeping; in commemoration of which, as it is said, a silver goose was periodically carried through the city of Rome in solemn procession, dogs being at the same time cruelly sacrificed: moreover, sacred geese were kept in the temple of Vesta, and no doubt pampered for the sake of their holy flesh; this we do not assert, but of one thing we are sure, that geese in ancient Italy were treated much as geese are in France at the present day—the "*paté de foie gras*" being a dish of great antiquity. Nor did the Romans spare to pluck these birds alive, a practice still continued in Italy, and, we are sorry to say, in other countries also. The white birds were deemed the most valuable for feathers, and vast flocks were driven from great distances to the precincts of the Eternal City. It appears from Pliny that it was not uncommon to pluck the geese twice a-year. We can hardly credit Pliny's account of the pilgrimage of flocks of geese (not voluntary on their part) from France, even from the Pas-de-Calais (now so called) to Rome; a fact which he himself says is astonishing. His words are:—"Mirum in hâc alite a Morinis usque ad Romam pedibus venire. Fessi proferuntur ad primos; ita ceteri stipatione naturali propellunt eos. Candidorum alterum vectigal in plumâ—velluntur quibusdam in locis bis anno. Rursus plumigeri vestiuntur; molliorque quæ corpori

quàm proxima; et e Germaniâ laudatissima. Candidi, ibi, verum minores, *Ganzæ* vocantur. Pretium plumæ eorum in libras, denarii quini." We may thus translate the passage:—"It is wonderful that these birds will travel on foot from the country of the Morini (the district around Calais and St. Omer), even to Rome. The wearied ones are placed in front, and the rest, by a natural crowding together, push them onwards. The plumage of the white geese is an additional source of profit; in some places they are plucked twice a-year, but the feathers are soon renewed. The down nearest the body is the softest, and that brought from Germany is in the highest esteem. There, the white birds, which indeed are the smaller, are called *ganzæ* (*gans*, German, *gaas*, Danish, *gas* Swedish, *gander* English). The price of their feathers amounts to five *denarii* (five eight-pennies) per pound."

What numbers of geese must have perished during such a journey! We know that the flocks brought up to London from Lincolnshire, Essex, Buckinghamshire, Surrey, and the Western Counties, are thinned by casualties on the road; but what are the journeys they perform to the long pilgrimage of the geese of the Morini! Many months must have elapsed before their final resting place was attained, and then in what condition must their flesh have been! We suspect that their *livers* were the great desiderata, and it is remarkable that in many or most parts of Italy at the present day, and also in other portions of the Continent, the goose is in little request for the table. It is not, we believe, a *fashionable* bird in England, though Strasburg *pâtés* made with diseased livers are universally esteemed and highly *ashionable*. "De gustibus non est disputandum." Some, for instance, relish the putrescent flesh of the deer and of the pheasant, and the roasted intestines of the woodcock filled (as we, on our word, have seen) with earthworms and small mud-insects. Query, is such a taste, whether for carrion or diseased liver, natural?

Let it here suffice us to have proved the early domestication and value, either for flesh or feathers, of the common goose. Let us attend to this important bird as we find it now in our own country.

If we traverse a common on which geese are kept, we find the flocks of the respective owners keeping together, and if by chance they mingle on the pond or sheet of water, they separate towards evening and retire, each flock to its own domicile. On extensive commons where many thousands of geese are kept, this rule is scarcely ever broken; the flocks of young geese brought up together, as their parents were before them, form a united band, and thus distinct groups herd together, bound by the ties of habit.

Within the last few years, comparatively speaking, our extensive commons have been enclosed or at least greatly circumscribed, and the number of geese kept by the farmers around, who had right of grazing, has been reduced accordingly. This has been the case, as a friend informs us, in Wiltshire; he remembers the time in which certain wide commons were the grazing grounds of thousands of geese belonging to different owners, each of whom had his own mark impressed by a punch on the webs between the toes of the birds—seldom, however, did the flocks commingle; goose-herds attended them, watching over the interests of their particular charge, and seeing them safely penned up for the night. These flocks were valuable, partly for their feathers, though not altogether so, for great numbers were consigned to fatteners for the London market; and hundreds, put upon their travels, were sold to casual buyers from stage to stage along the road.

Many geese, as we have seen, are reared in Surrey on the heaths or commons; and Lincolnshire still produces thousands. We do not now look to our home-bred geese for feathers, as we did some years since, for the continent is our chief resource; still the picture given by Pennant is not altogether effaced;—he informs us that geese in his day were kept in multitudes in the fens of Lincolnshire, a single person having frequently a thousand old geese, each of which reared on an average seven young ones, so that towards the end of the season the owner became possessed of about eight thousand. It is customary to pluck the geese once a-year for their quills, and four or five times for their feathers; and this practice is undoubtedly barbarous: it is asserted, however, that if performed at the proper *season*, it is less painful and injurious to the bird than might be supposed. The breeders say that they, for their own profit, pluck only such feathers as are near falling off, the removal of which gives but little pain, because such as are firmly fixed, having a little blood at the end, are the less valuable. We would ask, do geese moult four or five times a-year?—if not, then firm feathers are torn away to be renewed. Are the pinions plucked at the time in which they would be naturally shed? No! Are not young geese plucked as well as those of more mature age, early plucking before moulting-time being supposed to promote the growth of the feathers? It is so. Is it not a known fact that many birds die, especially in cold weather, in consequence of this treatment! How futile is it to attempt to prove that such a practice is not cruel. Pennant witnessed the "operation" during his journey in Scotland; let us hear what he says. His account is very interesting, and brings to mind Sir Walter Scott's

delineation of the redoubtable "Guse Gibbie," who left his feathered charge to act the part of a man-at-arms. "During the breeding season," says Pennant, "these birds are lodged in the same houses with the inhabitants, and even in their very bed-chambers; in every apartment are three rows of coarse wicker pens, placed one above another; each bird has its separate lodge divided from the other, of which it keeps possession during the time of sitting. A person called a *gozzard*, i.e., a goose-herd, attends the flock, and twice a-day drives the whole to water; then brings them back to their habitations, helping those that live in the upper stories to their nests, without ever misplacing a single bird. The geese are plucked *five* times in the year; the first plucking is at Lady-day for feathers and quills, and the same is renewed four times more, between that and Michaelmas for feathers only. The old geese submit quietly to the operation, but the young ones are very noisy and unruly. I once saw this performed, and observed that goslings of six weeks old were not spared, for their tails were plucked, as I was told, to habituate them early to what they are to come to. If the season prove cold, numbers of the geese die by this barbarous custom. When the flocks are numerous, about ten pluckers are employed, each with a coarse apron up to his chin. Vast numbers of geese are driven annually to London to supply the markets, among them all the superannuated geese and ganders (called the *cagmags*), which by a long course of plucking, prove uncommonly tough and dry."

The plan of plucking geese alive, is infinitely more cruel than the *rowing* of sheep, and yet that operation is sufficiently brutal.

In Pennant's time the feathers from Somersetshire were esteemed the best; those from Ireland the worst. Mr. McCulloch, in his *Statistical Account of the British Empire* (1839), says: "the best geese are found on the borders of Suffolk, and Norfolk, and in Berks. Somerset furnishes the best goose-feathers for beds."

It is not irrelevant to our plan to say something respecting the preparation of geese-feathers for use;—we ought not, indeed, to omit some notice of it; but we have no practical knowledge relative to any of the processes. We thank the writer of an able article in the supplement to the *Penny Cyclopædia* (an invaluable work), for supplying us with information; and, acknowledging our obligation, beg leave to extract as much of the paper on FEATHERS, as will bear upon the subject before us. "Goose feathers are divided into white and gray, the former being deemed the most valuable (as was the case, when Pliny wrote, among the Romans). The less valuable kind of feathers, known by the general name of *poultry feathers*, are obtained from turkeys, ducks, and fowls.

"Wild duck feathers are both soft and elastic, but their value is impaired by the great difficulty of removing the disagreeable odour of the animal oil which they contain.

"Various methods are practised of cleansing feathers from their oil, and the Society of Arts presented a reward of twenty guineas, in 1805, to Mrs. Richardson for a process considered superior to any then practised, in which the feathers were immersed for three or four days in lime-water, compounded of one pound of quick-lime to a gallon of water. After being steeped for this time, the feathers were placed on a sieve to allow the lime-water to drain away; they were then washed with clean water, and spread upon nets to dry, the whole being shaken from time to time, by which the dried feathers fell through the meshes of the nets. The whole process occupied about three weeks, and at its conclusion, the feathers were said only to require beating for use. Lime is used by the Irish in the preparation of feathers, but being applied too plentifully, they become loaded with dust, and consequently bear an inferior character in the market. In small quantity it appears likely to aid in the preservation of the feathers to which small portions of the animal fibre will occasionally adhere; but Dr. Ure seems opposed to its use, observing that 'bleaching with lime-water is a bad thing, as they can never be freed from white dust afterwards. Their only preparation,' he states, 'when cleanly gathered is, a slight beating to clear away the loose matter, but for this purpose they must be first well dried either by the sun or a stove.' Judging, however, by the communications made to the Society of Arts (*Transactions*, vol. xxiii., pp. 210-215), it would appear that the plan above described was successful in cleansing some feathers in a perfectly raw state, and others which, after being stoved for the period of three days, retained their unpleasant smell.

"The purification of bed-feathers by the agency of steam, has recently been practised on an extensive scale in London by Mr. Herring. By the process employed, which is secured by patent, and is applicable either to new feathers, or to such as have become deteriorated by use, the feathers are so greatly improved in softness and elasticity, that a much less quantity of them than of feathers prepared in the ordinary way, suffices to make a good bed.

"From a testimonial addressed to the patentee by Dr. Ure, it appears that the surplus feathers, removed in consequence of this improved elasticity, from three beds which were submitted to this process, were sufficient to make a fourth bed of excellent quality, of forty pounds weight."

When geese are plucked several times in a year for other feathers, the quills are only taken at the first plucking, about the end of March.

As taken from the bird, the horny substance of the barrel of the quill is covered, both internally and externally, with a vascular membrane which adheres very closely to it, and the substance of the quill itself, is opaque, soft, and tough. The quills must, therefore, be subjected to certain operations by which the membranes may be detached and dried up, and the barrel rendered transparent, hard, and somewhat brittle; previous to which they are sorted into primes, seconds, and pinions, the first of which consists of the largest and longest barrelled quills, and the others of such as possess these characteristics in a less degree. They are further sorted into right and left wing feathers, in order that all tied up in one bundle may have the same curvature; and before tying up for sale the *barb*, or feather proper, is usually stripped off from the inner edge of the stem, in order that they may lie compactly together. In a goose's wing it is only the five exterior quills which are fit for making pens, and of these the first is the hardest and roundest but the shortest, and the second and third are considered the best.

"Dutch quills," observes Dr. Ure, "have been highly esteemed, as the Dutch were the first who hit upon the art of preparing them well, by clearing them both inside and outside from a fatty humour with which they are naturally impregnated, and which prevents the ink from flowing freely along the pens made with them. The Dutch," he adds, "for a long time employed hot cinders or ashes to attain this end; and their secret was preserved very carefully, but it at length transpired, and the process was then improved." In the improved method the barrel end of the quill is plunged for a few seconds into a sand-bath, heated to about 140° Fahr., and then rubbed strongly with a piece of flannel. After this it appears white and transparent. "Both carbonate of potash and sulphuric acid," observes our authority, "have been tried to effect the same end, but without success." The above process is, however, sometimes followed by a brief immersion in dilute muriatic acid, which gives the appearance of age to the quills.

They must afterwards be made perfectly dry. The above is described by Dr. Ure as the French process; he notices two other modes adopted by London quill-dealers, the first of which is styled the Dutch method.

In it the workman, who is styled a *dutcher*, sits before a small stove fire, into which he thrusts the barrel of the quill for about a second. Immediately upon withdrawing it from the fire he draws it under the edge of a large blunt-edged knife, called a *hook* (shaped somewhat like a patten-maker's knife, and like it having a fulcrum at one end, formed by a hook and staple, and a

handle at the other end, by which pressure may be communicated), by which it is forcibly compressed against a block or plate of iron heated to about 350° Fahr. By this process, the barrel, which is rendered soft and elastic by the heat, is pressed flat, and stripped of its outer membrane without danger of splitting. It springs back to its natural form, and the dressing is completed by scrubbing with a piece of rough dog-fish skin. The principal workman employed in this operation can pass 2,000 quills through his hands in a day of ten hours. In the other method alluded to, which is considered inferior as it regards the quality of the quills for pen-making, although it makes them somewhat more pleasing to the eye, the quills are first stained yellow by steeping them for a night in a decoction of turmeric, then dried in warm sand, and subsequently scraped by the *dutcher* in the manner above described. Steaming for four hours has also been suggested as a good mode of dressing or preparing quills. By whatever process the external membrane is removed, that inside the quill remains separated from it and shrivelled up in the centre of the barrel, until it is cut open to convert it into a pen.

With respect to the treatment of geese little need be said. They require a dormitory apart from other fowls, and a green field or common with a convenient pond of water, such as we see at Barnes. Let not, however, the keeper of geese suppose that their daily grazing is sufficient for their maintenance in proper condition; on the contrary, they require a good supply of grain, oats or barley, morning and evening, and to deny them this is folly as well as cruelty. Many young geese common-fed only, pine and die for want of sufficient nutriment. Dysentery attacks them, accompanied by spasms of the limbs, or cramp as it is called; this disease is aggravated by cold and wet, their impoverished system is destitute of stamina, and thus a fair flock, prospering in spring, is more than decimated before autumn.

What is *worth* doing is worth doing *well*. Do not keep stock if you cannot *properly* keep them. "Let the flock's good feed be the master's heed; what at first he may cast will be doubled at last."

Thousands of geese are sent from various parts of the country to persons engaged in the business of preparing them for the market; for example, in the *Lincolnshire Chronicle* for December 1845, it was stated that Mr. Robert Fuller, a poulterer, of Boston, killed in one week for the London Christmas market, 2,400 geese, 1,000 ducks, and 500 turkeys, which altogether weighed upwards of twenty tons.

The management of geese by the great feeders in the vicinity of London is thus detailed in a communication to Mr. Moubray:—"Cleanliness,

punctuality, and regularity prevail; the business is conducted, as it were, by machinery, rivalling the vibrations of the pendulum in uniformity of movement. The grand object of preparing, not geese only, but poultry in general, for market, in as short a time as possible, is effected solely by paying unremitting attention to their wants; in keeping them thoroughly clean; in supplying them with proper food (dry, soft, and green), water, exercise-ground, &c. On arriving at the feeder's, they are classed according to condition, &c.: they soon become reconciled to their new abode, and to each other. They are fed three times a-day; and it is truly astonishing how soon they acquire the knowledge of the precise time; marching from the exercise-ground to the pens like soldiers in close column. Goslings, or young geese, come to hand generally about the month of March, after which a regular and constant supply arrives weekly throughout the season. At first they are fed on soft meat, consisting of prime barley or oat meal, afterwards on dry corn. An idea prevails with many that any sort of corn will do for poultry: this is a grand mistake. Those who feed largely know better, and invariably make it a rule to buy the best. The Messrs. Boyce of Stratford, whose pens are capable of holding the extraordinary number of 4,000 geese, independent of ducks, turkeys, &c., consume twenty coombs of oats daily, exclusive of other food."

Green geese are brought very early and in great numbers to the London market, where they sell at high prices. They are usually fattened on oatmeal and peas, mixed with skimmed milk or buttermilk—also upon oats or other grain, and are ready for the table at the age of about four months. Green geese are very delicate, but many prefer the Michaelmas goose (Michaelmas, "oh, word of fear, unpleasing to a goose's ear"), after it has fed upon the stubble fields, and gleaned in the barn-yard.

Persons who breed geese generally assign one gander to four or five females. In mild seasons the goose lays early; she sits with exemplary patience, but ought, during incubation, to be well supplied with food and water placed in a convenient and undisturbed situation, to which she may have free access. The gander is very attentive to his favourite, sits by her, and is vigilant and daring in her defence.

The goslings, or gulls as they are termed in some parts, require the same treatment as ducklings; it is advisable to pen the mother for a few days upon a dry grass plot or green sward, supplying her with water and grain, of which the young will partake; green food, as chopped cabbage, or beet-leaves, oat-cake cut small, and the like, may be given. One thing is imperative, let not the young be starved upon the grass of poor

common land—this miserable pasturage occasions disease and mortality; a few handfuls of corn given morning and afternoon, even from selfish motives, would turn to good account in the long run, but humanity commands what selfishness grudgingly allows.

Geese are seldom crammed in England, but in France this is a common practice, accompanied by barbarities so atrocious as to excite the utmost abhorrence. Rome of old has consigned, as a legacy to Europe, the *pâtés de foie gras*, but the practice of cramming geese in order to produce an enlargement of the liver, ancient as it may be, is abhorrent to the mind of any one who calls himself a *man* and a *Christian*. Who that possesses one spark of feeling could sit down and enjoy a dish prepared for him by the perpetration of the most unwarrantable cruelty. Let us *kill*, as reason and Scripture alike permit, but let us not *torture*.

One bird alone now remains for us to notice, and we hesitate as to the propriety of its introduction into a work of the present nature; yet, as a few lines only will be devoted to it, we trust to the indulgence of our readers. The bird to which we allude is the Vulpanser (*vulpes*, a fox, *anser*, a goose) of the Latins, *χηνάλωπξ* of the Greeks; that is, the Fox-goose, so called from its vigilance and cunning.

GENUS CHENALOPEX.

Bill as long as the head, slender, nearly straight, rounded at the tip, laminated on the margin, upper mandible slightly curved, nail hooked, lower mandible flat; nostrils sub-basal, upper mandible margined all round with brown, the centre of a reddish flesh colour; irides, orange; wings armed with spurs at the shoulder; tarsi, elongated; the three anterior toes fully webbed; hind toe, simple.

The EGYPTIAN GOOSE (*Chenalopex Ægyptiacus*, Gould; *Anser Ægyptiacus*, Brisson) is now kept only as an ornament to sheets of water, in parks and pleasure-grounds, where it breeds freely. In ancient Egypt it was common as a domestic bird, more so perhaps than was the ordinary goose, and correct representations of it have survived the lapse of ages, and found a resting-place in the museum of an island unknown to the Egyptians. Indeed, from the pictures and sculptured representations of ancient Egypt which time has spared, and from the remains of animals preserved in catacombs, a very correct estimate may be formed of the farmer's livestock in that country upwards of three thousand years ago.

In ancient Egypt goose was a standing dish; fish was prohibited to the priests, but they were well recompensed for this privation by a plentiful supply of *goose*, and also beef; but *goose* appears to have been the favourite dish, and if our ideas be correct, the present species of goose was most

in vogue. The following passage occurs in the work on the *Egyptian Antiquities* (vol. ii., p. 311):—"The Egyptian goose, the chenalopecx of Herodotus, is of frequent occurrence on the sculptures, though it was not a sacred bird, unless it may have some claims to that honour from having been a favourite article of food for the priests. A place in Upper Egypt had its name, Chenoboscion or Chenoboscia (*goose-pens*), from these animals being fed there, probably for sale, though these may have been sacred geese, for we are told that the goose was a bird under the care of Isis." The chenalopecx is not now a domestic bird of Egypt.

The Egyptian goose is spread throughout Africa and the adjacent parts of Asia and Europe. Mr. Gould, who gives an excellent portrait of an adult male in his *Birds of Europe*, states that he has not been led to do so by the number of half-reclaimed individuals which are yearly shot in our island, but from the circumstance of its occasionally visiting the southern parts of the Continent from its native country, Africa. M. Temminck, he remarks, particularly mentions the island of Sicily as one of the places frequented by it, and he adds that this is the species which would appear to have been held in great veneration by the ancient Egyptians, as we frequently find a figure of it among the monuments of that celebrated people. It is, he says, abundant on the banks of the Nile, and is distributed over the whole of the vast continent of Africa.

The Egyptian goose is a beautiful bird, and constitutes one of the links, as before observed, between the *anatidæ* and the *grallatores* or *waders*. Description as follows:—

Sexes nearly similar; female rather smaller than the male, and with the colouring less intense. Narrow edging of feathers round the base of the bill, a line running nearly straight from that edging to the eye, and a large patch surrounding the eye, chestnut; crown of the head, sides of the face and anterior part of neck, pale buff, approaching to white, gradually passing into rufous brown on the back of the neck; lower part of the neck of the same reddish tinge, which forms there a slightly marked collar. Upper part of the back light chestnut brown, rayed with very minute transverse irregular lines of dark brown, approaching to black; middle of the back and upper part of scapulars dark reddish brown, minutely rayed with irregular transverse lines of blackish brown and gray; lesser wing-coverts white, except the posterior row of feathers, which are crossed with black near their extremities, so as to form a narrow oblique band across the wing. Primaries, lower part of the back, rump, and tail, black; sec-

daries, rich green, glossed with purple. In the middle of the breast there is a large patch of deep chestnut; the rest of the under part of the body, from the slight collar to the thighs, pale buff, with irregular transverse blackish-brown lines. Vent and under-tail coverts rich buff. Legs and feet reddish flesh colour.

Thus we close our history of POULTRY. We have aimed not only at giving a practical view of our subject, but a philosophical one also, for he who understands the nature of the domestic animals, be they what they may, which he rears, will breed, treat, and manage them with a certainty to which the ignorant cannot pretend; hence we trust that our exposition of the characters of the classes to which our domestic birds belong, and the still nicer shades on which the families and genera are founded, will not be unappreciated. We have endeavoured to do justice to an important subject, and to treat it not as a "*fancier*," but as a scientific man carrying out his observations into the farm-yard and among our feathered dependants which gather round the good man's door; and indeed which constitute, collectively considered, an amount of property too little taken into calculation. With respect to diseases, what we have said when speaking of the fowl, will, as far as we know, bear upon all our domestic birds.* As to treatment generally, good air, good and sufficient food, pure water, cleanliness, regularity, warmth in winter, freedom as far as consistent with safety—these are the pivots upon which success depends. He who feeds poultry niggardly, robs his own purse. With this observation we conclude, hoping that our sketch of the nature, habits, and manners of the feathered races which man has called around him, some from Asia, some from Africa, and some from America, may not prove altogether unacceptable.

* It is advisable to refer once more to that destructive disease the *gapes* (see page 144), the cure of which has hitherto been so uncertain. In our account of *bronchitis* in 'The Ox' (pp. 122, 123), we advocated the exhibition of spirits of turpentine, and have given two formulæ in which turpentine constitutes the essential ingredient. That turpentine will be very efficacious in the case of fowls cannot be doubted. Indeed, a correspondent, who dates his letter, Wootton, Christ Church, Oct. 2, 1848, assures us that it is the *only* remedy on which to depend. His words are, "Half a teaspoonful of spirits of turpentine mixed with a handful of grain is a certain cure in a few days—giving a handful of such grains to a couple of dozens young chicks each day. It is the most perfect and unfailing remedy. I communicated this receipt to the *Gardeners' Chronicle* (No. xxix., July 17, 1847, p. 476), and I understand it has been found, by other persons besides myself, to be successful—perfectly so. In this part of England, it is the only disease of chickens, and for two seasons the number that died of it was very great." The *rationale* of this mode of treatment is as follows: the turpentine is absorbed into the system, and so brought into contact with the parasitic worms in the windpipe, to which it is speedily fatal—they are then ejected with the mucus, and the cause of irritation being thus removed, the bird speedily recovers.

B E E S.

AMID the profound mysteries and inexhaustible profusion of life by which we are surrounded, and which only deepen and increase to our eyes, as science leads us farther onwards—(not to baffle our inquiries, but to strengthen, by disciplining, the minds of the inquirers)—amid all the various manifestations of the boundless power of God, there is not, probably, one individual subject fuller of interest alike to the practical, the popular, the scientific, or the poetical mind, than the natural history of the Honey-Bee. To men of business engaged in rural pursuits, there is the great question of profit to be considered; to those who look merely on the surface of things for amusement, there is the spectacle presented of an insect community, constituted under a regular government, and exhibiting various social phenomena, which are not the less attractive that they are but partially understood; the man of science sees involved in the life of bees some of the most perplexing but attractive problems that can possibly engage his attention within the wide circle of created being; whilst to all in whom the poetical or idealising faculty exists, there is the additional interest derived in part from the habits of the bees themselves, and partly from the attention paid to them by the great human masters of “the art divine,” who, from the days of Virgil, down to those of Shakspeare and Milton, have loved them, aye, and understood them too in essentials, and have, in loving them, given the bees a new claim to the love and attention of all other men. The picture of a bee-kingdom, which Shakspeare has drawn in the following lines, has the precision of a naturalist, united to the fancy of a poet, and the wisdom of a philosopher:—

“So work the honey-bees,
Creatures that by a rule in nature, teach
The art of order to a peopled kingdom.
They have a king, and officers of sorts,
Where some, like magistrates, correct at home.
Others, like merchants, venture trade abroad.
Others, like soldiers, armed in their stings,
Make boot upon the summer's velvet buds;
Which pillage they with merry march bring home
To the tent royal of their emperor:
Who, busied in his majesties, surveys
The singing masons building roofs of gold;
The civil citizen kneading up the honey;
The poor mechanic porters crowding in
Their heavy burthens at his narrow gate;
The sad-eyed justice, with his surly hum,
Delivering o'er to executors' pale
The lazy, yawning drone.”

We are told that a bee-student of ancient times, Aristomachus, of Soli, in Cilicia, devoted nearly his whole time and thoughts to bees for sixty years; and that another, Philiscus, the

Thracian, spent his days regularly in the woods in order to investigate them in their natural condition.

These were evidently bee enthusiasts. Among the more moderate but earnest students of ancient times, may be briefly named, Aristotle, upon whose observations Virgil has mainly based his fourth Georgic, Pliny, and Columella, who is esteemed the most accurate among these early observers. In modern times, the study appears to have assumed an altogether more definite and scientific shape in the hands of such men as Swammerdam, Maraldi, the supposed inventor of glass hives, our own profoundly philosophic Ray, Reaumur, Schirach, John Hunter, who first discovered the true origin of wax, and, above all, Huber, who is especially the high-priest of this particular altar in the great temple of science.

We know not whether the *inquiring* spirit of Aristomachus or Philiscus exists among us at present, but certainly the name of those who aspire to *teach* the economy of bee-management is Legion. In Cotton's *My Bee-Book*, there is a list of other people's bee-books, to the number of about one hundred and twenty-five distinct publications. One conclusion may no doubt be safely drawn from this fact—either to the mind or to the pocket, the subject is found profitable. We trust to show in the present paper, that it may be both to the readers of the *Farmer's Library*. And as the knowledge of the natural habits of the bee is the only trustworthy foundation of the artificial ones we must, to some extent, impose upon them in servitude, let us begin with the former. We shall say little of the more technical points of the study, and, we hope, use none of its jargon; but having stated that the honey-bee is one of the species *Apis*, and forms, with the other species of bees, of which there are some two hundred and fifty in England alone, the order *Hymenoptera*, we shall at once request our readers to imagine themselves doing what they will find it very pleasant to do in reality, watching the chief operations of a hive through glass walls, with the aid of the most experienced eyes.

A swarm, led off by an old queen, has been just housed, in a warm and comfortable straw tenement, but it is empty—unprovisioned. Everything has to be newly made; a giant task, but nobody understands better than bees the “philosophy of labour,” and, as Gay sings,

“In the little bulk, a mighty soul appears.”

So while some go off to the fields to perform the labour allotted to them there, let us see what they

are doing in the hive. Some are clustering about the top; and now they fix themselves to the roof by the fore-legs, while the hinder-legs hang down. Upon these other bees suspend themselves, and leave their legs similarly to the disposal of the new-comer, and thus a ladder is rapidly formed, reaching at last to the very bottom of the hive. To facilitate operations, and perhaps strengthen as well as elaborate their scaffolding, they also hang themselves in festoons, each end attached to the roof; and before the actual commencement of labours, there is a series of such festoons formed, so that the bee-workmen may ascend and descend in every direction. The entire weight of this living staircase is borne by the individual bees at the top, and cheerfully borne, too. Sydserrf (re-printed in Cotton) says they will suffer their legs to be disjoined before they will let go their hold. Such is the patriotism of the hive.

And now the bee-architect steps forth. Great bee! it is his glorious task to shape out the design of the first combs, and to lay, as it were, the first stone of the structure; tasks always performed by a single bee. But he must have materials, and, lo, the obedient and industrious explorers of the country return to bring it to him in rapid and uninterrupted succession. They arrive, each mounts the ladder, extracts with its hind feet a plate of wax from under one of its eight scales (or pockets), where it was secreted, raises it to the mouth, turns it round under the cutting edge of the jaws (thus obtaining the effect of a capital circular saw), and so the whole is divided into fragments. A frothy liquor is then formed on it from the tongue, and the mixture assumes the aspect of a plastic but tenacious substance, white and opaque; and in that state is handed to the bee-architect, who at once commences the construction of the comb, while the labourer goes on with the preparation of the remainder of the scales, and then hurries off to collect fresh supplies. This labourer belongs to the wax-workers' class.

The architect commences his work: first, he constructs a block in the centre of and upon the roof, of the shape here shown, and which measures nearly half an inch in length, about one sixth of an inch in height, and only a twenty-fourth part of an inch in thickness.

All this while, another set of bee-artisans, the sculpturers, are waiting impatiently to begin. No sooner do they see room enough to introduce their

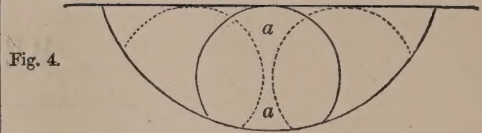


Fig. 4.

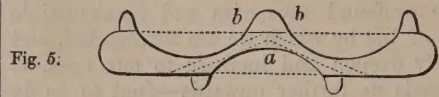


Fig. 5.

Fig. 4. Front view magnified. Fig. 5. Transverse section through the same.

somewhat smaller bodies between the wax-workers than they commence operations on the comparatively rude block thus prepared for them. First one partially hollows out a cell on one side, adding to the edges, at the same time, whatever he excavates (see the round part in fig. 1). Presently two others are busy excavating on the other side (see the double circle in fig. 3), in such a position that the line between them exactly corresponds with the centre of the first cell. And now observe the wonderful skill of the bees. The cells do not remain, as shown in the transverse section, fig. 5, of a semicircular shape. The bees are aware that would cause an unnecessary expenditure of wax, decrease the available space of the hive, and probably interfere with that perfect ventilation, or at least purity of air, which they obtain by methods that surpass our skill to find out, much less rival. "From some eudiometrical experiments it has been ascertained that the air of a well-stocked hive is as pure as that by which it is surrounded."* So the bees, working to a perfect plan laid down for them by their architect, obtain a perfect result. By gradually cutting away all superfluous wax in the semicircles first formed, in the direction of the faint dotted lines, fig. 5, the walls become straight, and eventually the cells of two tiers present the aspect here shown:

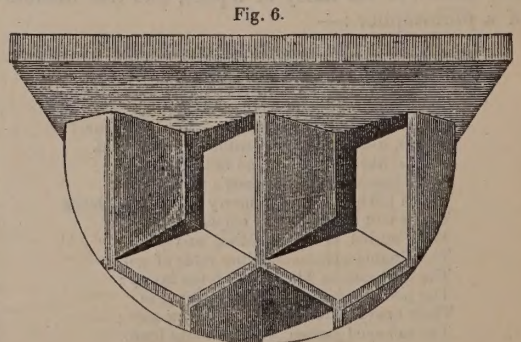
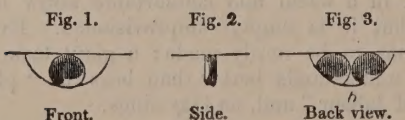


Fig. 6.

It will be seen that the back cells must necessarily be of the same shape to fit exactly into

* Dr. Bevan's *Honey-Bee*. The best bee-book, on the whole published in England.

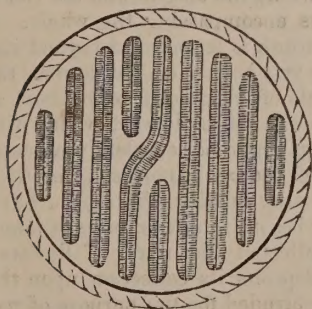


The front, side, and back views of the block on which the first excavations for the cells are made.

these, and the same with those below. Every wall is the wall of two cells, each roof also a floor, and each floor also a roof. The first tiers consequently are pentagonal, or five-sided, the roof to which they are attached being straight, whilst all the other tiers below are hexagonal, or six-sided, their top being the two planes that form the bottom of the upper tier. Each cell is thus surrounded by six others. The cells lie nearly horizontal, their mouths being a little elevated, and opening upon the street, or passage, which the bee-architect leaves on each side of every comb. Such is the general construction of the cells.

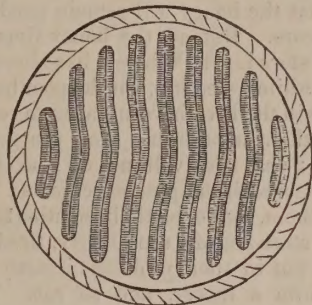
Whilst this first block is thus being deposited in a straight line across the roof of the hive, and hollowed out into cells as fast as it is deposited, and the work also continues downwards towards the floor of the hive, other blocks, or combs, are commenced parallel with it, divided only from it and from each other by the streets just mentioned, which are about half an inch broad. And so the work will proceed until the hive is filled with comb. Looking down upon the lines of combs in a completed hive, they would present the shape here shown (fig. 7), presuming the irregularity in the centre did not exist. And why does that irregularity

Fig. 7.



the place of the sixth comb, then resumed their straight forward course. Next, working from the opposite end of the fourth or interrupted comb, they advanced to the interruption and stopped, and so the space there was duly filled up. Then they filled up the unused part of the space that belonged to the fifth comb, which had been so irregularly intruded upon, by a similar short line, and the general arrangement of the hive was scarcely less perfect than ordinary. Here again (fig. 8) is another case of interruption. The bees apparently

Fig. 8.



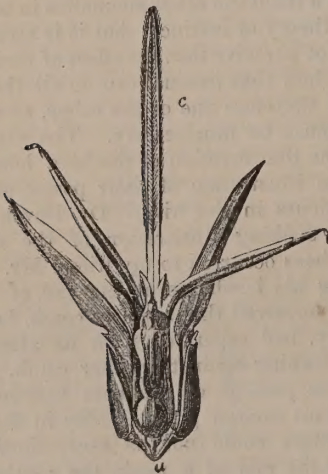
found themselves compelled to give such a winding course to the first comb that they could not do better than exactly imitate its shape for all the others; and how beautiful is the result! Ingenious persons, no doubt, undertake to explain these and a thousand other anomalies in accordance with the theory of instinct; but it is strange that they do not perceive that the effect of their reasoning is to show that instinct can do all that reason does, and therefore one or the other, as a distinct quality, must be unnecessary. The above cases refer to the first erection of the bees' home. Let us give an illustration of their power of dealing with accidents in the hive. Dr. Bevan tells us, "A very striking illustration of the reasoning power of bees occurred to my friend Mr. Walond. Inspecting his bee-boxes at the end of October, 1817, he perceived that a centre comb, burthened with honey, had separated from its attachments, and was leaning against another comb, so as to prevent the passage of the bees between them. This accident excited great activity in the colony, but its nature could not be ascertained at the time. At the end of a week, the weather being cold and the bees clustered together, Mr. W. observed through the window of the box that they had constructed two horizontal pillars betwixt the combs alluded to, and had removed so much of the honey and wax from the top of each as to allow the passage of a bee: in about ten days more there was an uninterrupted thoroughfare—the detached comb at its upper part had been

exist? The answer to this question forms one of the many proofs of the weakness of the theory which attempts to divide by strictly defined impassable barriers the faculties of bees, under the name of instinct, from the reason which guides ourselves. Between bee-reason and man's reason a space "wide as the poles asunder" may exist, but taking Dr. Bevan's definition that reason is the power of making deductions from previous experience or observation, and thereby adapting means to ends, whilst instinct is the power to perform certain actions in an uniform manner, without reference to either observation or experience, then it is certain that in every department of bee-economy we find innumerable examples of the former. The irregularity shown above is a case in point. A stick was in the way of the fourth comb from the left, so the bees deviated to the right into

secured by a strong barrier, and fastened to the window with the spare wax. This being accomplished, the bees removed the horizontal pillars first constructed, as being of no further use."

But the bees wait not for the completion of their grand palace to use it; as soon as a few cells are ready, in come the honey bearers. Each makes his way to a finished chamber, goes as deep into it as he can, opens a hole with his feet in the cream-like crust which the bees have formed for the defence of the honey, and so discharges the honey into the cell through his open mouth. His burden gone, off he flies; others take his place; drop by drop the cell is filled, and then closed so perfectly that the honey will remain good in them for many years. But all the honey thus brought home is not stored. The bringers have been feeding themselves while collecting, but the poor hard-working artisans in the hive have nothing to eat, unless they cease their labours and stop the great work of the hive; that they will not do; so the others attend to them with the greatest care and affection. They go to them, they open their mouths (the temporary honey store-house), the hungry, tired workers of the hive put in their proboscis exactly as they would do into a flower, and so eat. This proboscis is too interesting a piece of vital mechanism to be passed by with only an indirect mention. So let us first show it greatly magnified, as in the accompanying engraving (fig. 9), and then examine

Fig. 9.



it a little in detail. Though the parts of which the proboscis is composed are so minute as to be scarcely visible to the unassisted eye, yet they are far more complex than the mighty elephant's trunk.

The proboscis consists of no less than five distinct branches; namely, a central trunk, or tongue, and four horny scales, tapering to a point, convex

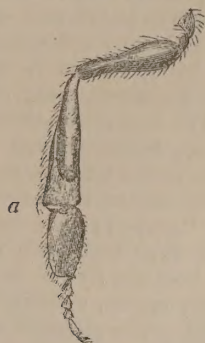
outwards, and concave towards the trunk. The two outer ones so sheath the inner, as to appear but one single tube. By a joint in the middle they bend or extend all at once, carrying with them the unarticulated tongue, which is cylindrical, and about the size of a human hair, and appears through a magnifier to be composed of successive rings. It has probably as many short muscles as the tongue of a fish, which are capable of moving it in all directions, and towards its termination is furnished with hairs, or villi, some of which at the point are very long, and seem to act like capillary tubes. Mr. Wildman assures us that he has seen the trunk growing bigger and less by turns, swelling the instant the bee sucked, and this alternate lessening and enlargement propagated from the extremity to the root. What a delicate apparatus of invisible muscles must perform this office. The tongue is capable of being contracted and folded up at pleasure, for if it were constantly extended, it would be exposed to injury. When at rest, therefore, it is doubled up by means of its joint, and lies in a very small compass; the first portion being brought within the lip, and the second part folded under the head and neck, protection is given to it by a double sheath, consisting of four strong scales, the two inner scales sheathing the tongue, and the two outer and larger ones encompassing the whole. When at work, the trunk is lengthened beyond its sheaths, probes the very bottom of the flowers, through all impediments of foliage or fructification, and drains them of those treasured sweets which without such an apparatus would be completely inaccessible. The proboscis of the bee is not used like that of other flies, not being tubular like theirs, but serves as a brush or besom to sweep, or as a tongue to lap. Having collected the nectar of flowers in small drops, it deposits its collection upon the tongue, which is protruded for the purpose of receiving it, and having received it, withdrawn again.*

Whilst honey is thus being collected for the present nourishment of the workers in the hive, and for future supply in case of need (observe, the sealed stores are never touched except in periods of real distress among the community), another important department of the commissariat of the hive is attended to in a no less exemplary manner. There will be young ones in the hive by-and-bye; how are they to be fed? "Why, with bee-bread, to be sure," answers some old nurse-bee of the hive; and so having, we may suppose, received their instructions, the bees set out to collect pollen as well as honey, from wherever they can find it. If you watch the bees as they return to the hive, you will scarcely see one of them without a little ball or pellet of farina on each of its hinder-legs, at the part marked *d* in the accompanying

* Dr. Evans, in *Bevan's Honey-Bee*.

engraving [fig. 10]. These balls are invariably of

Fig. 10.



The hinder leg of the Worker-bee; a, the part on which the pollen is carried.

the same colours as the anther-dust of the flower in which these luxurious little rogues have been rolling; there can be no doubt, therefore, that it is of this substance, after it has been used for the reproduction of vegetable life, that the bees take possession, to assist in the rearing of their infantine insect life: another instance of the economy that exists amidst all the profuse wealth of the natural world. Well, the little pollen-bearers come back to the hives; there they are met by the expectant nurses, who take part of the pollen from them and devour it, but not for themselves, it is only laid by for the future use of the larvæ. As to the rest, watch that bee yonder; after the nurse has done with her, she is looking for a cell, making a noise all the while with her wings to call her brethren around her. On reaching the cell, with at least one attendant, she balances herself firmly on the edge with her middle and hind legs, whilst with the fore legs (her arms and hands) she seizes the farina, drops it into the cell, and leaves the attendant bee to knead it into the bottom and varnish it over, whilst she flies back to "fresh fields and pastures new."

There is yet another substance formed in those wonderful little chemical workshops, the bees' bodies, *propolis*, which is of a resinous nature, and derives its name from its uses. Propolis signifies *before the city*; the Greeks having observed that it was used by the bees to strengthen the outworks of their city. It is with propolis the combs (or the blocks out of which they are constructed) are fastened to the roof of the hive. It is with propolis the bees defend themselves from catching cold or rheumatism through draughts, by stopping up every crevice into their hive, no matter how minute, so that one only opening shall exist, the proper legitimate entrance. M. Réaumur once thought proper to fasten the glass of a hive with pasted paper, in a careless manner, before putting in a swarm. Just

as he had anticipated, the bees found out his unworkmanlike conduct, and contemptuously tearing away with their teeth the trumpery defence he had put, they made all firm and taut, as the sailors say, with good solid propolis. Once an unlucky shell-less slug crept into a hive. After having settled him with their stings, the bees vanished him carefully over with this same propolis, to prevent his becoming unpleasant in the dog-days. Another, confiding apparently in his impenetrable shell, an impudent, idle, yet honey-loving snail, thinking to plunder their stores, appeared on the threshold of their dormitory—to learn, alas! most unexpectedly, a new use for this wonderful composition; the bees actually glued him down to the ground, at the edges of his armour, as firm and immoveable as a rock, before he had time even to explain that he was but looking in, and intended to go back again instantly.

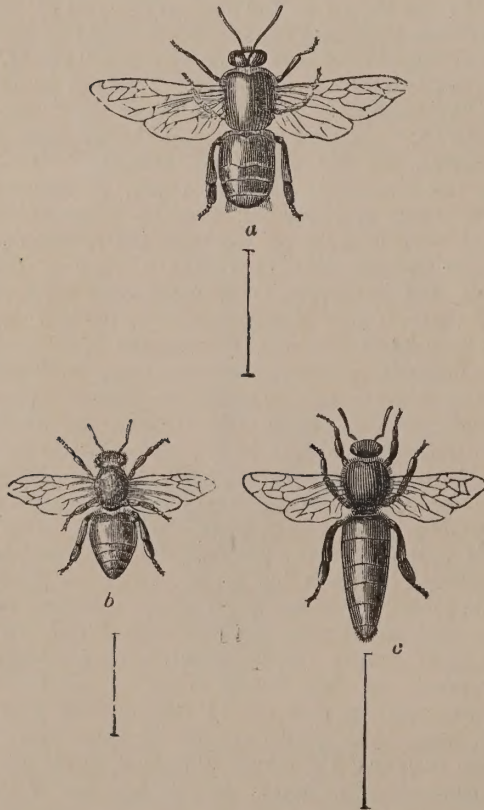
The mansion thus in process of erection, the storehouses thus being rapidly filled, the great mysteries of life and reproduction begin to evolve their wondrous phenomena.

In our respect for the wisdom of some of our ancestors, we cannot but transcribe their theory of the propagation of bees. We have said "theory," but that is hardly the right word; for the following "experiment of the generation of bees" was, it appears, "*practised* by that great husbandman of Cornwall, old Mr. Carew, of Anthony." Thus run the directions:—"Take a calf, or rather a sturk (steer), of a year old, about the latter end of April, bury it eight or ten days till it begin to putrify and corrupt; then take it forth of the earth, and opening it, lay it under some hedge or wall where it may be most subject to the sun; by the heat whereof it will (a great part of it) turn into maggots, which (without any other care) will live upon the remainder of the corruption. After a while, *when they begin to have wings*, the whole putrified carcase should be carried to a place prepared where the hives stand ready, to which, being perfumed with honey and sweet herbs, the maggots, after they have received their wings, will resort." This, it appears, was a practical man's method of proceeding to stock his hives. Need we, then, wonder that the ancient poet, whose guidance he was (perhaps unwittingly) following, Virgil, who has given similar directions, only more poetically expressed, in his fourth Georgic; need we wonder that the poet should take on trust in his day, what "that great husbandman of Cornwall" would recommend to others, *after trial*, in his day, so many centuries later? Let us now see if we cannot trace, with tolerable clearness, nature's own method of proceeding. It is not easy to follow the operations of the bees during the incidents we are about to describe, but patient observers have succeeded in doing so; and with their aid, then,

let us again turn our eyes inwards upon the hive. Behold the queen-bee, attended by her guard of some dozen bees, moving slowly and with regal dignity among her subjects. You cannot mistake her for an instant, even if you did not see how the way opened for her movements, how all the heads of the workers are inclined towards her as she moves, and how fondly they caress her with their antennæ in passing; for she is in person every (fraction of an) inch a queen, and bears the stamp of sovereignty upon her in most legible characters. She is larger than any of her subjects, as well as more elegant in her form. The abdomen, especially, is much longer than in the bees around her; the wings much shorter, and the legs and antennæ of a paler colour.

The respective appearances of the queen, the worker (or honey-collector, whether known by the name of wax-worker, or sculpturer, or nurse-bee), and the drone, of whom we shall speak by-and-bye, are shown in the accompanying sketch.

Fig. 11.



The three descriptions of Bees of a hive. *a*, the Male or Drone; *b*, the Neuter or Worker; *c*, the Female or Queen.—The lines denote the natural length of each.

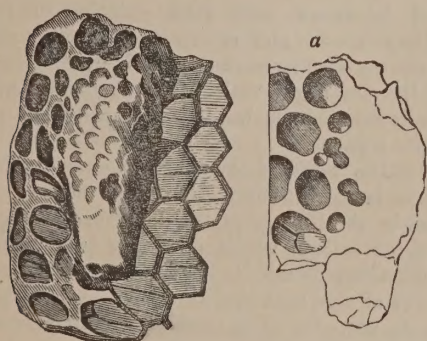
Look again into the hive. The queen is about

to commence her maternal labours in the deposition of eggs; from which are to issue the future community, or possibly half-a-dozen communities. To shut out from prying eyes, and invest the whole affair with the solemnity and splendour befitting the occasion, a living curtain is formed impenetrable to all but the most patient, skilful, and fortunate eyes. The bees attach themselves to each other in the mode before pointed out; but then the object was to form a ladder—now it is a screen required. So they connect themselves into a dense mass, a perfect “grape-like cluster, or living garland.” This is done with such wonderful skill and ease, that bees can fly off from the cluster, even from its very centre, without exciting confusion in the group. The strength of the topmost bees is here shown even more strikingly than in the formation of the ladder; the bees at the top have, in these moveable clusters, nothing to take hold of to enable them to support the weight of their comrades, and appear to need nothing. Possibly, as Mr. Wildman supposes, they may possess some power of distension, and so, like fishes, buoy themselves up. Thus attended, and amid all the rejoicings of her subjects, the queen proceeds to a cell, thrusts her head into it to see if it be quite as it ought to be, which of course it is among such zealous and industrious housewives, then turning, she inserts her abdomen, leaves an egg in an upright position, fixed by a glutinous matter, and moves on to repeat the operation in another cell. The fecundity of the queen partakes almost of the miraculous. Huber speaks of 200 eggs daily been laid; Schirach, of 100,000 in a season; whilst a correspondent of the *Gardener's Chronicle* has had queens that have laid 1,000 a-day for three months in succession.

During a considerable period the eggs of workers alone are deposited, or, in other words, eggs are deposited in the cells for the worker bees only, which form the great mass of the cells, as the workers form the great bulk of the bee community. But after a certain time the queen begins to lay eggs in the cells of the drones, which are larger and more substantial than the cells of the workers, and later built. Their position is generally near the bottom of the combs. And now, by what mysterious law is it that twenty days after these drone-cells receive their eggs, from which are to spring the males of the future community, the worker bees begin the erection of a still more stately species of cell for the deposition of the eggs that are to become queens, and to be fertilized by the said drones. Who can tell? These royal cells show how little of mere routine or slavish adherence to instinct guides the bees. They differ in their numbers in different hives, from three or four, to twelve or thirteen; they are situated frequently at the sides of the combs;

but are also found in the very centre, standing erect like a queenly palace, near two inches high, and erected with a most loyal disregard of all those habits of economy which the bees show in so striking a manner in their meaner erections. Thus, for instance, they will use as much wax to build one of the royal cradles, as would suffice for a hundred of the others. The form of the royal cell is not unlike that of a pear suspended perpendicularly, with the sides or walls full of holes.

Fig. 12.

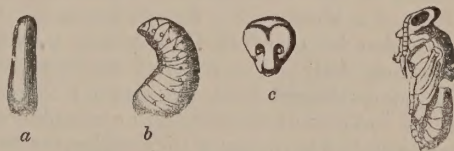


The queen's cell; a, side view of the same.

For four days the egg of the worker-bee remains apparently unchanged. But the vital principle is at work within, and at the appointed time, on the fifth day, a small white worm, with several ventral rings, appears at the bottom of each cell. This increases in size, nourished probably by the whitish transparent fluid in which it floats, until its extremities touch the sides of the cell, when they curve, and the extremities begin to approach each other, until they almost form a ring. The nurse-bees now come to feed it with bee-bread; the little worm—larva—maggot, or grub (for by all these names it is known), opens its lateral pincers, and the precious morsels are eagerly devoured. Réaumur supposes that this bee-bread is no longer what it at first was, farina merely, but that it is mixed in the stomach of the nursing-bees with honey and water. He even thinks the nurse-bees can alter the relative strength, as it were, of this mixture, to suit the strong or more delicate stomachs of the nurslings, as they are more or less advanced in growth. We shall see, by-and-bye, they can not only do this, but have important objects to attain in so doing. The larvæ soon show the effects of such good feeding, by nearly filling up the whole space of their cells. That is the signal for a new operation. The nursing-bees now seal up the cells with a light-brown cover. No more luxurious feeding at present. The larva must begin to work. It is the lot of all, bees as

well as men. Happily for the bees, they seem never to have any doubt, or to make any fuss, about their "mission," strange, and wonderful, and beautiful as are the operations they have to perform. To live, to know their work, and to do it, are with them convertible propositions. The larva now begins to line the cell with a silky film, alternately shortening and lengthening its body in the process. This silky thread proceeds from the middle part of the under lip, and is composed of two threads gummed together as they issue from the two adjoining orifices of the spinner. The larva then encloses itself in a cocoon, after the fashion of the silk-worm, and looks not very unlike an Egyptian mummy in its swaddling-clothes. This process completed, in about thirty-six hours, it is no longer a larva, but a pupa or nymph. At last comes the hour of true birth, when the young imago, as it is now called, shall breathe the pure air of the external world, and bask in the rays of the golden sunshine. On the twenty-first day after the deposition of the eggs, the young ones, of a grayish colour, may occasionally be seen in front of the hive, undergoing the process of purification at the hands of the nurse-bees. Some days elapse before the young worker-bees and drones can fly. As to the queen, special provision is made, as we shall see presently. The accompanying engraving illustrates the changes we have described.

Fig. 13.



a, the egg; b, the larva; c, the pupa of the worker-bee; and d, the head of the larva magnified.

The people thus rapidly coming into existence, where are its future governors? Watch the old queen as the spring advances, the period when all these changes are at their climax, and you will be more than ever astonished at the wondrous phenomena of the bee-mind. See how restlessly she runs about. Now she seems about to go on laying eggs, but hurriedly withdraws without doing so. No wonder she is agitated. She is about to abdicate; not about to lay down the cares and glory of sovereignty, certainly; but about to quit her established, and peaceable, quiet kingdom, to go she knows not whither, with a part of her subjects, exposed to she knows not what accident before she may again find herself by her comfortable, regul, warm comb (her fire) side. But she

respects the laws of nature, and obeys them. In those cells which she runs over in so much agitation, lurks her successor, waiting but for the proper hour to ascend the throne. How easily she could tear open the cells and destroy her. But a power greater than ambition withholds her. The bees no longer pay her their usual attention. An idea of divided allegiance seems troubling them. They get as excited as their queen. Some terrible calamity—civil war, perhaps—impends. Oh, no! the bees are at once too sensible and too unselfish. They divide—perhaps take leave of each other affectionately, and off goes the first swarm, led by their reluctant but duty-obeying monarch.

But bees colonise—not merely emigrate. It is not merely the young surplus population that are compelled to go forth, but, on the contrary, a mixture of bees of all ages, and, no doubt, of all conditions. They do not rush away from home careless of what becomes of them when abroad. They don't trust to bee-gossip of the advantages of this place, or the disadvantages of that; and find out too late how absurd they have been. No, they send out scouts to examine the face of the country, and make them proper reports. Would one could look at a few of the bee "blue-books." As this fact of the scouts has been doubted by some of the bee-men, who seem to think the only way to understand these insects, is to think as meanly as possible of their capacity, we may observe that the following cases are given by Dr. Bevan on the authority of one of the most accurate and profound of observers, Mr. Knight, from a paper published in the *Philosophical Transactions*, in the form of a letter to Sir Joseph Banks. "On one occasion he observed from twenty to thirty bees paying daily visits to some decayed trees, about a mile distant from his garden; the bees appeared to be busily employed in examining the hollow parts, and particularly the dead knots around them, as if apprehensive of the knots admitting moisture. In about fourteen days these seeming surveyors were followed by a large swarm from his apiary, which was watched the whole way, till it alighted in one of these cavities. It was observed to journey nearly in a direct line from the apiary to the tree. On several similar occasions the bees selected that cavity which Mr. Knight thought best adapted to their use." He noticed at another time that a tree, after having been examined and apparently approved of, was deserted in favour of a hive; a circumstance he attributes to long hereditary habits of domestication. That they do prefer such homes appears tolerably clear, for they will flock to them under unpromising circumstances, such, for instance, as the hive in question being strewn over with dead bees. But probably the bees know perfectly well how to estimate the value of such an alarming-looking

spectacle; and can accurately determine whether it was owing to any peculiar defects in the hive, or simply to some one or other of those ills to which bees are heir. Mr. Grant, the author of some very interesting papers on bees in the *Gardener's Chronicle*, witnessed their operations in a case of this kind. "In a quarter of an hour from their taking possession, they were observed busily employed bringing out the dead bees, small fragments of honey-comb, dead insects, and other dirt; and by the middle of the following day a little conical heap of their cleansings was to be seen on the ground in front of the hive; before night well loaded labourers were seen entering to repair the dilapidations, and refurnish the empty cells." The swarm once re-settled in their new habitation, their labours begin with the construction of the comb in the mode we have already described in the preceding pages.

But the round of the yearly phenomena in the old hive is not yet completed. We must see what passes in the hive after the departure of the first swarm or colony, which generally takes place in the morning, or middle of the day, when a great number of the bees are abroad, collecting honey. Stirring news for them to receive as they return to the hive! However, there is no time for lamentation; no good in disorder. So, gradually, quiet is restored. And then we may see the nurse-bees once more at work, engaged not only in tending the ordinary young, but in what may be called the culminating point of their annual labours, the helping forth into the world the royal scions, and from which they will supply their own queenless realm. They accordingly scrape away from one of the royal cells the wax that has been so lavishly bestowed upon it. Doubt not but they know which is the right one, that is to say, where lies the oldest of the young unborn queens. And here is exhibited another remarkable example of the bee-provision. The eggs in the royal cells were all laid with an interval of at least a day between each. Now that they are coming to maturity accordingly, they come not altogether, but in due succession, by which means the bees, as we shall see, have time to know how many of them they shall want, and be able to provide accordingly. In due time the royal pupa within obeys the stirring influences that call upon her to burst her cerement, and she would at once emerge into perfect life, but that the nurse-bees, who keep watch and ward over her, knowing what is good for her better than she does herself as yet, immediately solder over the top of the cell with wax, and keep her prisoner for about two days. Why? In order, evidently, that she may not, like the other young bees, be unable to fly when she emerges from the hive. And this is not left to guess-work. The bees know accurately when she is prepared, and most

likely, by means of the quality or nature of the sounds she emits, which to man's grosser ears come in the shape of a number of monotonous notes, so rapidly repeated as almost to combine into one continuous sound. At last she comes forth in her perfect beauty and power. What an hour is that for the bees; especially for those indefatigable, careful, admirable, model-matrons and housewives, the nurse-bees! We envy Mr. Grant the pleasure he once enjoyed of "having an excellent view of the young queen, about two inches above the entrance, enjoying and cleaning herself, and receiving great attentions from her subjects." But it is in every sense a spring season, with its changeable weathers and moods. The young queen learns—how, we wish some one would tell us—that there are other young queens, successors and possible rivals, in the hive. She, too, grows excited, whilst, unlike the old queen, she knows not what to do between conflicting impulses. She rushes to the cells—she will tear them open—she will sting the tenants to death—she will—but no; the cells are powerfully guarded, it is for the community to determine in a legitimate mode how these vast questions are to be dealt with; they warn her away; they bite her if she resists. She would even be in danger, but that, in case of extremity, she is in possession of some magical words (we tell no fairy-tale) that in an instant render the sentinels motionless. But if, taking advantage of this calm, she again approaches the forbidden ground, they recover themselves, and, in military phrase, do their duty. Huber witnessed this most interesting scene more than once. He describes the young queen at such a time as standing with her thorax against a comb, and crossing her wings upon her back, keeping them in motion, but not unfolding them, whilst she emitted the dread mysterious sounds, which were responded to by the weaker and hoarser cries of the yet pent-up unborn queens that she seeks to destroy. And what is it the bees want her to do, but learn the lesson bequeathed to her by her predecessor—leave the hive with another colony, and relinquish the rights of sovereignty over the parent community in favour of one of her helpless sisters. And so, at last, she departs, and a second colony is speedily in course of establishment. Possibly a third, and yet a fourth, and a fifth, may follow; the number of swarms being determined, no doubt, in ordinary circumstances, by the number of the bees, and the heat of the hive. But when the last swarm has departed, and the number of the inhabitants so lessened that the guards of the royal cells can no longer preserve their efficiency, the remaining young queens emerge as they please, two or three at a time, and civil war, alas! does at last take place. But what an admirable mode of making civil war it is. It is the monarchs who fight, and

who are but few in number, and must, therefore, soon bring the contest to an end; it is the bee-people that look on, quite content to pay allegiance to the conqueror. Of course no bee-subject can thus be in danger, by espousing the wrong side, of losing his property, or his rank, or have his temper exasperated by defeat and humiliation; the contest affects none of these things. Let us, too, watch the contest. Two young aspirants for the throne are meeting; they rush at each other; each seizes with her teeth the antennæ of her rival; they cling in mortal combat so close together that head, belly, and breast are mutually opposed. But nature has made them aware of their value, or possible value, supposing there were no other incipient sovereigns in the hive; and of the danger of instant death to both, should they in that position launch at each other the fatal dart. So they separate by a tacit mutual consent, and would apparently leave the combat to be determined at some other time. But that will not do for the bees. They can stand no shilly-shallying in the matter. They must and will know who is to be their ruler. Is government to stand still because the would-be governors are cowards? Certainly not. So the rivals are again driven together into the arena, no matter how often the queens seek to evade the mortal issue, until at last the stronger one seizes the other by the wing, curls her extremities under the body, and inflicts the death-pang. She is now unquestioned mistress of the hive. Love succeeds to war. The Amazon of the hour changes, for an equally brief period, to the tender virgin, whom many aspire to woo and win. High in the air, where no eyes may follow, the drones prepare her nuptial couch. Before she ascends, she looks carefully around her, perhaps to assure herself against prying eyes, perhaps to know her own kingdom again, of which she has yet had so little experience. A few coy half-flights now take place, as though her mind misgave her, and, at last, she rises, describing in her flight large horizontal circles, until she is beyond the ken of human eyes. She returns in about half an hour, and so ends her brief time of love. Henceforward she is the queen and the mother (literally) of her people, and exhibits accordingly, ever afterwards, the gravity and decorum suitable to her exalted position.

A sad business remains behind. The post of queen's favourite has always been an honour of dubious value, often of tragic ending, even among mankind; with bees it is truly a fatal destiny. No sooner is the business of swarming ended, and the worker-bees satisfied there will be no lack of fertile queens, than issues the terrible edict for the massacre of the drones. Poor fellows! It is to be hoped they comfort themselves with the reflection that their fate is an everlasting homily, pre-

sented by nature in dogmatical but most effective fashion, of the uselessness of all who labour not for their living. If one must die for the good of one's kind, by all means let it be as a martyr. Poor fellows! how they dart in and out, and up and down the hive, in the vain hope of escape. The workers are inexorable. Huber tells us the latter plant their stings so deeply—for the most part between the segments of the abdomen—that they cannot extricate themselves without turning as upon a pivot. The cruelty apparent in the fierceness of the attack is perhaps only kindness, for the wound is *immediately* fatal: the drones expand their wings, and die. The instrument of all this slaughter, the sting, is certainly one of the most beautiful and perfect weapons in creation. Look at the edge of a razor, at a needle's point, and a bee's sting, under the microscope, and then perhaps some idea of its exquisite character may dawn upon the mind. Whilst the razor-edge looks like the back of a stout knife, villainously made, too blunt and uneven to cleave a billet of wood; whilst the point of the needle appears to be some quarter of an inch broad, and of irregular shape, full of holes and scratches, the sting shows everywhere the most consummate workmanship, ending in a point too fine to be discovered. Yet this penetrates instantly the comparatively thick skin of a man's hand. And this again is but the scabbard or sheath of still more delicate instruments, namely, two bearded darts. The sting acts thus:—When the bee is about to sting, the sheath is first thrust in to make an opening; then follows one of the darts, penetrating a little farther into the flesh, and holding by the four beards on its outside; then the other makes a still farther advance, and so they progress alternately until they acquire a firm hold of the offending body. Lastly, there issues into the wounds thus made, a poison from two glands at the base of the sheath. As Paley has justly observed, “the machinery would have been ineffective without the rankling poison; the poison could not have been used unless some opening were made for it: a striking example, indeed, of the union of chemistry and mechanism.”

The ordinary tenor of the bees' unwritten constitution regarding the succession to the throne having been thus indicated, there remains to ask what do they do in case of accident, supposing their queen to be lost or dead, and no other young queens forthcoming from the royal cells? This is perhaps, even among so many interesting phenomena as bees afford, the most interesting of all. And first, let us ask how they know when a queen is lost? Of course if she is lying dead before them, they can at once perceive the extent of their calamity, and very touching is the mournful respect they pay to her deceased body. But how is it that in a hive, say of twenty thousand bees, the

whole are in a state of profound agitation very soon after her abstraction? It has been said, that if they do not touch her with their antennæ occasionally they at once conclude she is lost. But surely it is not meant to say that twenty thousand bees can be for ever touching the queen in endless and due rotation in order to be satisfied of her presence? Clearly the bees have a language. Look at the many incidents already narrated, for which some kind of language appears indispensable, and without which we cannot imagine their truth. Indeed, there is not one of them in which the supposition of a power of rapid communication from one to many does not seem involved. Huber's experiment showed, we think, that the bees have a language, and that the antennæ form the organ. He divided the bees of a hive into two portions—so that no physical communication could take place. The bees, where the queen was not, soon grew agitated, and after waiting a due time, three or four hours usually, evidently said to themselves, “Our queen is lost; let us make another,” and set to work accordingly. How, we shall show presently. Huber then repeated the experiment, but opened a communication through a grating wide enough for the antennæ to pass through. All remained perfectly quiet. Every bee's loyal heart remained placid and content. Now how could this happen except in one or other of these three modes? The queen must have come to the grating, and remained there while every one of the bees in the sundered portion came and touched her with his antennæ; or the bees knew positively from each other there was nothing the matter; or lastly, and this is the most rational supposition, they took it for granted, as we do, when we hear nothing about *our* gracious sovereign, that all went well. But if, on the contrary, the bees hear the terrible news that their queen is missing, that no one knows where she is, or when she will return—what do the poor distracted creatures do? Shakspeare says—

“The Commons, like an angry hive of bees
That want their leader, scatter up and down,
And care not whom they sting.”

Bees' loyalty is no lip loyalty. Dearly do they love her, and, so far as they can, protect her. Dr. Warder tested this, somewhat cruelly but most decisively. “Having shaken on the grass all the bees from a hive which they had only tenanted the day before, he searched for the queen by stirring amongst them with a stick. Having found and placed her, with a few attendants, in a box, she was taken into his parlour, where the box being opened, she and her attendants immediately flew to the window, when he clipped off one of her wings, returned her to the box, and confined her there for above an hour. In less than a quarter of

an hour the swarm ascertained the loss of their queen, and, instead of clustering together in one social mass, they diffused themselves over a space of several feet, were much agitated, and uttered a piteous sound. An hour afterwards, they all took flight, and settled upon the hedge where they had first alighted after leaving the parent stock; but instead of hanging together like a bunch of grapes, as when the queen was with them, and as swarms usually hang, they extended themselves thirty feet along the hedge, in small bunches of forty, fifty, or more. The queen was now presented to them, when they all quietly gathered round her, with a joyful hum, and formed one harmonious cluster. At night the Doctor hived them again, and on the following morning repeated his experiment, to see whether the bees would rise. The queen being in a mutilated state, and unable to accompany them, they surrounded her for several hours, apparently willing to die with her rather than desert her in distress. The queen was a second time removed, when they spread themselves out again, as though searching for her. Her repeated restoration to them, at different parts of their circle, produced one uniform result; and these poor, loyal, and loving creatures always marched and counter-marched every way as the queen was laid! The Doctor persevered in these experiments, till, after five days and nights of fasting, they all died of famine, except the queen, who lived a few hours longer, and then died. The attachment of the queen to the working-bees appeared to be equally as strong as their attachment to her; though offered honey on several occasions during the period of her separation from them, she constantly refused it, disdaining a life that was no life to her without the company of those which she could not have!" What did Burke mean by saying the age of chivalry was gone? Had he forgotten the bees?

If a new or strange queen be introduced into the hive within two or three hours after they have thus lost the rightful sovereign, she will experience an opposite kind of manifestation of bee-loyalty. However true a queen by nature she may be, she is here a pretender. The bees therefore surround her, and starve her to death: they have too much respect for queens to sting them. So do they check undue monarchical encroachments. On the other hand, if a stranger queen be introduced to them some eighteen hours or so after the loss of their own, they look upon her very differently. She is a benefactor, and welcomed accordingly. It is true, they are guarded in their first reception; they treat her as a prisoner for a time, perhaps still hoping their own beloved mistress may yet return, but in the end she receives the adhesion of all. If twenty-four hours have passed since the loss of the ordinary queen, the bees are so delighted at the thought of a successor to the vacant

throne, that a stranger queen is gladly accepted the instant she presents herself.

But supposing no such fortunate accident to counterbalance the unfortunate one, the bees then resort to the wonderful power that has been given to them of—in a sense—making their own queens. Certain larvæ, two or three days old, lying in the ordinary cells, and that would in the ordinary course become working-bees, are selected; three of the cells adjoining to each of them are broken down and formed into one; the nurses bring the royal bee-bread, or "royal jelly," which is of a more stimulating pungent character than the ordinary composition, and give the larvæ thus royally destined a lavish supply. They then pass through the usual stage of pupa to that of perfect queen. The discoverer, or rather, perhaps, the reviver and promulgator, of this startling metamorphosis was Schirach, a clergyman of Little Bautzen; and his experiments have been confirmed by Huber. It has been therefore supposed that the working-bees are undeveloped females. But Mr. Pettigrew, a well-known practical apiarist, will not allow the matter to be thus explained away, but makes it even more extraordinary by denying that it is merely the eggs of workers that can be thus metamorphosed. He says—"How startling soever it may seem, how doubtful soever my friends may be, I, were I worth a thousand pounds, and given to betting, would wager it all that I would cause the bees to metamorphose all the eggs that a queen may lay into drones exclusively; nay, I would cause them to be metamorphosed into working bees in March, and into drones in April, and so on alternately, and a few into queens at any time."* This is a point to which it would be well if scientific men would give renewed attention. All the known facts appear at present to favour Mr Pettigrew's statements.

It appears that the bees are occasionally subject to mishaps in the process of development from the egg. On one such occasion, when the larvæ of a queen was concerned, the incident was marked by some peculiarly interesting phenomena. Keys, the author of a very excellent book entitled 'The Antient Bee-Master's Farewell' (1796) beheld the whole, and thus recorded his observations:—"I saw the workers very busy in demolishing a royal cell, close to the window of a box. It had been sealed up some days; but continuing so beyond the usual period of exclusion, I suspected some mischance, and therefore was very intent to observe the result. At five o'clock one morning, the workers were very deeply engaged in opening the side of the cell; in about two hours they had made a chasm large enough to see the nymph, and which they were endeavouring to pull out, but in vain. They then proceeded to a further enlarge-

ment, when the queen, with hasty steps and anxious looks, as if angry at the delay, began herself the arduous task, the workers remaining quiet spectators. The queen made several violent tugs to disengage it, but her efforts proved fruitless. She then retired, not without an appearance of displeasure. The workers then renewed their attempts, about a dozen at a time, and at intervals ceased to enlarge, while they tried to pull the nymph out, but were still disappointed; for on pulling the nymph upwards she was pressed more into the convexity of the top. Four hours were thus employed, when the queen returned, with like demeanour as before, and proceeded with redoubled efforts to extricate the nymph, but still, unfortunately, with no better success, and finally relinquished the toil with great concern. However, the labourers resumed the task of enlargement from top to bottom, which was not effected till near twelve o'clock; a business of seven hours to draw the nymph out. It was full-grown, but—*dead!* The explanation given is, that the season having been bad, the wax was formed too coarsely, and much thicker than usual. The royal pupa was therefore unable to extricate herself at the right time, and not doing so, the bees, *knowing that she ought to have appeared*, were sure there was something the matter, and did exactly what any other sensible beings (bees or men) would have done, opened it to see, and to aid if not too late.

We must now take a slight glance of the more salient points of BEE GOVERNMENT.

The "busy" bee, then, is by no means so busy as he is commonly supposed. He finds time for leisure and relaxation as well as for work. Mr. Grant thinks the bees work in relays for about six hours, and that sleep duly follows labour. He says—"I have come to this conclusion from repeated observation, that in proportion to the number leaving at the early hour of five in the morning, nearly an equal number came in to repose at eleven A.M.; and those that left at later hours in the morning, ceased from their field labours at intervals of about six hours during the day. Those that had returned from labour could be easily distinguished from the others that had not been out, as the former occupied particular positions until those that were asleep were awakened, and vacated their place to go on duty, and then the others might be seen taking up their positions, and in a short time afterwards were fast asleep." It is interesting to look in upon the hive when the bees are asleep; to see the workers, each with its head and thorax in a cell, giving, in the dilatation of the abdomen, the only sign of life; to mark the queen reposing from the cares of office in the cell of a drone, while the workers form a reverent circle all about her, gently touching her body; or to speculate when the 'lazy drone' means to break from his

apparently interminable nap, lasting eighteen or twenty hours at a time.

Regular sentinels guard the entrance to the hive day and night; and these, says Mr. Grant, are relieved with as great regularity as in military life. Very necessary precautions! for the bees, like all other wealthy communities, are particularly liable to be preyed upon by hosts of enemies. There are the terrible corsair bees, for instance, who, from ill management and insufficient feeding, cease at last to depend upon their own industry, and live solely by plundering the fruits of the industry of others. And, as might be suspected, when bees *do* turn to bad courses, they do it very effectively. They send out their spies to explore the country around, and to find out which are the weakest hives. The poor Humble Bee is infamously used by these corsairs. They give him no peace at home or abroad. They strip his hive in his absence, and if they meet him in the fields, they cry, in but too intelligible language, stand and deliver! and are obeyed. The Humble Bee gives all up, and then, when they let him go, departs, sadly enough no doubt, but patiently, to collect more honey, and hope for better luck in carrying it home. Then, again, there is the terrible death's-head moth (*sphinx atropos*), which frightens most men and women who see it for the first time; no wonder, therefore, that bees are alarmed when they find themselves directly subject to its attacks. This moth appears towards the close of summer, and if it makes its way into the hive, commits great ravages. It can, if necessary, when hard pressed by the bees, emit a shrill mournful cry, which paralyses the bees. But of course the bees do not submit quietly to all this. No—their military genius now shines forth brilliantly. They barricade themselves; they erect formidable fortifications of the most impregnable wax at the entrance of the hive, so that only one or two workers can pass at a time, and the sphinx never. It is worthy of observation, that it is only *after* they have suffered that they erect these barricades; and then they only keep them whilst required, and whilst they are productive of no inconvenience. When spring comes, and the enemy is—nowhere—to them at least, they joyfully clear all away to facilitate the important events of the time. Dr. Bevan mentions an anecdote that goes far to show that bees possess memory and language. A colony had been attacked in 1804 by the sphinx, and suffered through its *tardy* preparations. In 1807 the moth re-appeared, when the bees *immediately* constructed fresh ramparts. Now, working bees do not live more than a year at the outside; therefore the particulars of that awful year must have been conveyed from generation to generation, or the queen must have reigned over the hive from 1804, and have been the means

of rousing the community of 1807 to the danger they experienced. Language and memory appear equally indispensable in either case. Beside the sphinx, the honey moth and the honey-comb moth attack bees, and more cunningly than the sphinx, as well as more successfully. They are so small, that they can get into the hive sometimes, notwithstanding the vigilance of the guards, and deposit their eggs in the combs. What a place for a mother to choose! What a chevaux-de-frize, as it were, of stings all about her pretty ones! It matters not, however, to them, as she well knows. The larva, once successfully hatched, rapidly covers itself with silk, which the bees cannot destroy nor penetrate with their stings for the destruction of the noxious intruder. Gradually this silken covering becomes a tube or covered way stretching in any direction that the larva pleases right through the combs. When this enemy becomes numerous it is all over with the hive; the bees have no choice but to desert the place altogether, and construct a new habitation.

As to the internal government of the bee-community, Mr. Grant states there are some bees that appear never to work themselves, but take regular rounds to ascertain whether all bees are performing their duties satisfactorily; but it is probable that these officers or magistrates of the hive, may also, like the sentinels, fulfil their high duties only in rotation. And sad enough these duties occasionally are—involving no less than penal judgments. Mr. Grant beheld “two bees brought out of the hive by other bees, assisted by one on each side as guards: they were evidently condemned criminals. They were thrown down in front of the hive, stung to death, and then the executioners returned to the hive as though conscious of having performed a highly praiseworthy duty.” He supposes these unfortunates to have been either strangers or unruly members: but as this involves a serious point of the bee criminal jurisprudence, we had better suspend our judgments until the facts are made clearer. Perhaps the criminals were a pair of the corsairs recently described. As to the bee-police, we shall content ourselves with the illustration afforded by an anecdote. “A few pounds of honey had been taken from a hive by its owner, and placed in a closet of a room of which the door was closed. The bee-police, however, appear to have been following the stolen goods, and watching their opportunity, stole in through an open window into the room, and thence by means of a crevice into the closet itself. How the bees must have enjoyed the sport as they hurried to and fro until they had completely emptied the abstracted combs, and re-deposited the whole of the honey in the centre of the hive: their own once more!”

Bees appear to be decidedly backward in sur-

gery and the medical art, and probably kill their sick and maimed, when the cases are too difficult; but then they take care to have few of such cases. They are your true sanitary labourers. See how carefully they clean the floor of the hive at every favourable opportunity; how they remove all decaying or dead exuviae; how admirably they ventilate in hot weather. But that process deserves a few words of explanation—it is at once so interesting and unique. The ventilating bees take up their position in two bodies, one larger than the other, near the entrance, but so as to cause no interruption of the way. The small body near the door turn their heads inwards, the other and larger, standing farther within, look towards the entrance of the hive. The bees then uniting their wings together by means of small marginal hooks, so as to increase the surface, move them to and fro with such velocity, that the wings almost cease to be distinguishable. This is hard work, and has to be continued incessantly at certain periods, so the ventilating corps is renewed all the more frequently, that is, at intervals of about twenty-five minutes.

THE MANAGEMENT OF BEES

Can be best understood by a careful study of the habits of the insect; and therefore it is, that, independent of the interest we wished to inspire in the proceedings and modes of life of a most attractive little community, we considered it advisable to preface any necessary practical details, by dwelling at some length on the phenomena from which alone can be derived just principles of management. Study nature, and she will herself show you where—and how—you may occasionally assist her when she requires assistance in the attainment of *your* especial object; but never attempt to conquer her, or to turn her completely aside from her own path. In other words, leave the bees as far as possible to their own instincts, by accommodating all your requisitions to their habits. This cannot be done by following implicitly mere dogmatic instructions, derived from other men's experience, capable with them, no doubt, of being adapted to changing or unexpected circumstances, precisely because based on experience that is ever ready to correct and inform the ideas it sent forth, but which to you, wanting that experience, may fail at your utmost need. We shall not, therefore, crowd these pages by very long minute details of bee-management. Of course there are some points of practice easily explained, not liable to the danger we have pointed out, and indispensable to the young beginner in bee-keeping. These we shall endeavour to state clearly and efficiently. But for the most part all the details of bee-management can be best learned from practice, and the study of the essential

objects, details are intended to secure. It is also to be observed, that such details are unsettled to this hour, and vary among the best apiarists. We begin with a few words on the

PROFITS OR BEE-KEEPING.

Sydserrf supposes, in an estimate that we shall try to make clearer than as he gives it, that every swarm or stock may produce another annually for sale, whilst the entire number of the stocks kept in hand shall be doubling yearly, which can only be accomplished thus :—

1st year,—1 stock produces 2, making 3 in all;
from which one is sold, leaving 2; product £0 10 6
2nd year—2 stocks produce 4, making 6 in all;
from which 2 are sold, leaving 4; product.. 1 1 0

and so on. The expenses of the hives being defrayed by the honey obtained, what will be the result in fourteen years? Why that the last of the fourteen would produce £4,300 16s. from 8,192 hives! We wonder whether Sydserrf ever asked himself how many apiaries could be doing this at the same time in England, and still obtaining 10s. 6d. for each hive? A less amusing but much more useful calculation would be, to see what could be done by relying upon keeping your stocks yourself to produce honey, which can always be sold, and which would probably be much more largely consumed if it were cheaper. Here is a wide field open for skill and enterprise. All apiarians are agreed as to the profitable nature of bee-keeping. Bees in good pasturage, well managed, will give two swarms yearly; and, in favourable seasons, the first swarm will the same year give one or two glasses of honey. No noticeable capital is required to commence; no noticeable amount of time is necessarily consumed in their management, and they may be kept almost anywhere, though not with equal profit. One apiarian, whose authority may be depended upon, gives the profits of eight stocks only as averaging about £20 in three successive years. Another, who was regularly engaged from six to six daily in other avocations, cleared nearly £100 in one year by his bees. The quantity of honey that may be obtained from a hive is exceedingly variable, but offering, therefore, only the greater assurance of due rewards for able management. Fifty or sixty pounds have not unfrequently been obtained from a single hive in a season, and occasionally as much as 100 lbs; whilst from a set of collateral boxes, 110 lbs. is mentioned; and Cotton states that as much as 290 lbs. have really been stored in a single season by a single stock similarly situated in a roomy trebled habitation. The prices of honey in London are stated to be generally as follows :—

	s.	d.
Minorca, which is the best	per lb.	2 6
Narbonne	"	2 0
Pure native honey in the comb	"	1 0
Other native honey	"	0 8

But pure native honey in the comb, obtained in glasses, is sought for the table, and therefore often sells for double the price above-mentioned. We shall only add, that Mr. Smart, a well-known apiarian, considers *hundreds of stocks* may be kept where only tens are now to be found, so far as regards the capabilities of support, the main point to be considered. To that subject, therefore, we now turn :—

BEE-FLOWERS.

Conspicuous among all the plants loved by bees (for the best of reasons, that they get the most honey or other substances from them) are clover, wild-thyme, heath and broom, borage, French buck-wheat, and *Melilotus leucantha*. This last may be usefully grown for the bees' especial gratification. It is easily cultivated, blooms from June to November, and is ornamental, in addition to its other good qualities. But the most important qualification of bee-pasturage is, that there shall be always something for the bees, from the very earliest spring to the very latest autumn. It will be useful, therefore, to append a

LIST OF BEE-FLOWERS.

Spring.	Summer.	Autumn.
Erica carnea*	Syringa	Michaelmas daisy
Winter aconite*	Helianthemum	Winter savory
Rosemary*	Annual poppy*	Purple houseleek
Laurustinus	Sea-kale	Ivy
Hazel*	French willow	French buckwheat,*
Snow-drop	Sweet-briar	sowed at Midsum-
Crocus*	Bean	mer
Willow*	Yellow lupine	Honeysuckle
Osier*	Mignonette*	Spanish broom*
Primrose	Blackberry	Hollyhock*
Hepatica	Chestnut	Heath*
Violet	Mallow	Sunflower
Almond	Lime*	Lemon thyme*
Wallflower* (single)	Hysop	St. John's-wort
Borage*	Teazle	Melilotus leucan-
Onion	Nasturtium	tha*
Gooseberry	Yellow vetch	
Apricot	Sainfoin	
Peach	Broom	
Apple	Wheat	
Gooseberry*	Viper's bugloss*	
Currant*	Raspberry*	
Laurel	Symphora	
Turnip*	Racemosa ;	
Cabbage, &c.*		
Strawberry		
Tulip		
Hawthorn		
Gorse or furze		
Columbine		
Laburnum		
Berberry*		
Ribes Sanguineum		
Dutch Clover*		

Those marked with an asterisk are understood to be the flowers especially favoured by the bees. What a choice little garden for himself, as well as for his bees, the apiarian may make from the above list, if he does not choose to leave the bees dependent upon the stores of the neighbourhood at large.

THE HIVE.

This should be formed of some material that will neither readily receive and conduct the summer's heat to the hive, nor radiate its own heat away from it in winter. Straw and wood are both good non-conductors of heat, and are both much used. The common straw hive answers every purpose when bee-management in its simplest shape is desired; and if a more elaborate system is to be pursued, the same straw hive is easily made the chief portion of a larger structure, having conveniences for facilitating artificial swarming, or preventing swarming altogether, so far as it can be prevented, or for removing the honey. The straw hives have one advantage over those of wood; they admit freer passage of air by insensible degrees into the hive, and of moisture out of it. It will save the bees time and trouble, *which to you means honey*, if you take care the inner surface of the straw hive is carefully freed from all roughnesses. India matting has been used with success for lining straw hives. But use no paint, nor washes, nor anything of the kind.

A GLASS WINDOW should be let into the back. This is not merely an agreeable adjunct, as admitting you when you please to a certain degree of familiarity with the bees, but often proves of use in questions of pure business management. Bees, however, if they courteously answer your courteous mode of approaching them (which is, by gently breathing only through your nostrils, and with an easy nonchalant air, that seems to say, I don't care for the bees, and they have no reason to care for me), if they endure your society, they will hardly flatter you so much as to like it; therefore disturb them as little as possible, and never uselessly. You may have occasion to turn up the hive, to examine the interior, or remove a part of the contents; but this must not be done after the flower season is past, for the bees can no longer collect propolis to renew the fastening you destroyed,—that by which the bottom of the hive was securely fixed to the board on which it stands: an indispensable provision against winter cold.

ASPECT.—A north, north-east, or north-west aspect is recommended; but there appears no objection to a direct southern one, if you take care that the fierce rays of the meridian sun shall not stream upon the poor perspiring bees in summer, and if you take care to prevent its perfidious rays in winter from wooing the bees forth in the delusion that, as the old song says,

"Summer is yeoming in,
Loud sing cuckoo;"

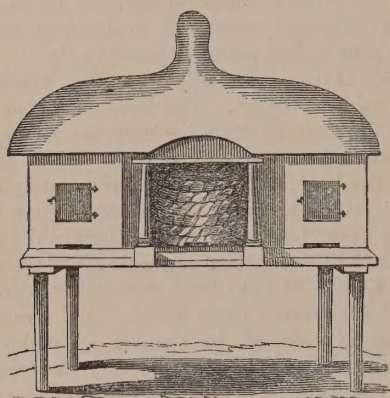
and then leaving them before they have got back to the hive, chilled and hungry, no flowers to be seen, dropping down at last in their exhaustion to rise no more.

THE SITUATION—must be dry and airy, though fierce winds must be completely shut out by the natural defences of the place. It must also be free from noisome smells and great noises. The hive must be protected by an overhanging canopy against rain and drip. Damp is perhaps the greatest of all bee-enemies. As to the others, let your hive stand upon one or more posts or pillars, according to its size (*most securely fixed*, accidents with hives are very dangerous things), so that "mice and rats, and such small deer," may not be able to annoy the bees. Some effectual precautions should be taken to prevent children from interfering in any way with the bees, either intentionally, or, which is more likely, by accident. There are cases on record of children suffering severely by some unlucky interference, construed no doubt by the bees into an attack, and resented accordingly.

VENTILATION.—Do not attempt to teach bees the art of ventilation. We have seen they know how to do what we do not—keep the air as sweet within their home as it is without. Open any crevice in the hive, and they will immediately stop it up with propolis. Your experiments may worry, but will never teach or improve them. We do not here speak of ventilating any side-hives for special purposes, but of the chief one, where the bees live and are rearing their brood. Mr. Grant once tried an experiment in the way of making the bees more comfortable, by simply covering the ordinary entrance at the commencement of frost with a piece of perforated zinc; "but in a few minutes afterwards the bees became unsettled, and crowded to the entrance, evidently oppressed by the alteration I had made, and appearing to absorb the condensed air on the zinc, which induced me to remove it altogether. Shortly afterwards I attempted to contract the entrance by inserting a piece of wood one inch long by half-an-inch thick, leaving about one and a half-inch open. The wood had not been applied many minutes, when two of the bees came and examined it, with the object of removing it, as they fixed their hind-legs to it, and pulled with all their strength; but failing in their endeavours, they, with several others which subsequently joined them, ran about the entrance and appeared to be very uneasy. As I could not bear to see them uncomfortable, I withdrew the piece of wood, upon which two of them immediately occupied the position where it had been placed, and continued fanning for nearly ten minutes as if it had been the warmest day in June." He then left them to ventilate themselves ever after, with the most perfect success. And here let us observe, that Mr. Grant has shown that zinc should never be used in hives; a white powder forms upon it, which is presumed to be poisonous, and which the bees evidently made great exertions to be rid of.

THE BEST HIVE—is that one which, while it best secures the health and prosperity of the inmates, best facilitates the particular modes of operation adopted by the owner; these admit of great variety, especially with regard to the taking of honey, and the increase of the number of communities. We know of no hive more generally useful than Mr. Grant's, the one here shown, and which we venture to copy from the *Gardener's Chronicle*. At all events, a brief description of this will show the kind of thing desiderated, and afford a good point of departure for those who can improve upon it.

Fig. 14.



The straw hive is seen in the centre, with its entrance at the bottom, and a projecting foot-board, or landing-place, under cover of the portico, so that when the bees hurry home in numbers on the approach of rain (and bees are the best of barometers), they may not be drenched while waiting for room to enter. The square compartments at the sides are moveable boxes, about ten inches square, and one inch thick, with a shutter enclosing a glass-window to each. These would have been better placed at the back, so that the observer might have been out of the way of the bees as they made their entrances and exits. Perhaps, too, it would be better to treat these side-boxes as mere cases for hives to be put within them; as it is a great advantage to have all hives exactly of the same size and shape. No division need in that case exist between the different compartments of the case beyond the walls of the hive themselves. Each box has its own separate entrance and foot-board. Bell-glasses for receiving honey may be placed on the hive, and on the side-boxes. A moveable roof, light and warm, covers the whole, and is put on and off without difficulty. A tube of communication, which can be opened or closed at pleasure from the outside (and which does not prevent the removal of a side-box), extends from the straw hive

in the centre to each of the boxes, so that the bees can pass freely, when the owner chooses to let them.

COMMENCEMENT OF OPERATIONS.

And now, gentle reader, we will venture to suppose you, as an admirer of bees, or of the profit that may be derived from them, are determined to commence operations in a quiet careful way, that shall give you an opportunity of learning, by the management of a few, how to deal successfully with any number. If it is spring when you commence, purchase a recent swarm just comfortably settled in a new hive, weighing not less than four or five pounds, and for which you may pay, perhaps, ten shillings. If it be autumn, your best way will be to obtain a swarm of the same year, with all its "plant," as the commercial men say, of combs and brood; in short, an established but still young colony. This should weigh from twenty-five to thirty pounds, and contain, according to the apian's not very flattering or poetical mode of calculation, about half a bushel of bees. For this you will not pay too much by an expenditure of twenty shillings. If you buy a colony of older date, you know not how undue may be the proportion of the "plant" over those who are to work it, and must not trust to weight alone, but see that the combs are of a pale colour, as dark ones show age, that they are worked down to the floor of the hive, and that the interstices of the combs are well filled with bees.

WINTER MANAGEMENT.

Supposing you commence in autumn, this will be one of the first things on which you will be anxious. First, as to their *food*; second, as to their *protection against cold*. If bees require feeding in the winter, it is because they have been wrongly deprived of the very stores they had laid by for that season. One of the advantages of all systems of double or treble hives, as we may call the junction of two or three hives or side boxes together, in technical language storifying, is, that they allow the central or chief portion of the colony to remain permanently undisturbed, so that there is always food in it for the bees when required. If a hive weigh less than twenty pounds at the approach of winter, food should be given at once, so that there may be no disturbance in the hive in the periods of frost. The best of all modes, because the most natural, is to lay a piece of honeycomb in the hive about October or November. If that be not readily obtainable when wanted, honey in a plate will do, with short straws over it for the bees to alight on, or good sugar mixed with boiling water in equal weights. If necessary, the hive may be raised, to receive the plate or comb, by an eke—that is, a hive prematurely cut short, as it were, in the construction, at three or four rounds. This

fits exactly the bottom of the hive, and forms a continuation of its edges. It will be good economy to repeat this feeding in spring, when the bees begin to stir about, but find the flowers not so early as themselves. The food in spring may be placed outside the hive, under the protection of an empty hive or any other suitable cover. All this feeding, however, is quite unnecessary where bees are regularly well managed, and the hives have grown strong. As to *protection from cold*, bees in good hives really need none beyond what is afforded by freedom from damp, and severe winds, shutting out the direct rays of the sun in winter and early spring, and, above all, by taking care that they are not left too few in number to keep up the natural heat of the hive. This appears to be their own mode of protecting themselves. As the weather grows more and more severe, they draw more and more closely together into the centre of the hive to create their fireside, towards and from which all the bees approach and recede in fair and wise rotation; whilst, on the contrary, as the cold decreases, they again expand in proportion. They are not, therefore, torpid, or not regularly so, at least. Of course, they do not work, nor do they in winter itself appear to eat, except in periods of unusual warmth, which stirs alike their limbs and their appetites. The judicious apiarian will see that the less frequently these untimely movements occur the better will it be for the bees and for him.

HONEY-TAKING AND SWARMING.

With spring come the chief duties of the apiarian, which are all summed up into two words, *honey*, which he wants to take; and *swarms*, which he wants to check or encourage just as he desires to increase the honey at the expense of the increase of the brood, or *vice versâ*. Bees desire to increase and multiply; and all their preparations and filling of barns and stores is with reference solely to that view, over and above their own possible necessities. There is no reason to doubt that they can find ample supplies of food for both purposes, however great the fecundity of their queen-mother. But it is clearly impossible that they can rear the largest amount of brood and give to man, at the same time, the largest amount of honey they can make, and which was made for that brood. The apiarian must, therefore, constantly distinguish between these two departments of bee-management, and promote the one that he most desires success in; or else strive to hit that golden mean which shall obtain the largest possible increase together of hives and honey.

The modes in common use in England among the best apiarians, and which are very various, may, perhaps, be all classified thus:—

1. The common straw hive is used, with a

square top for glasses, or small straw hives known as caps, to be placed on them from about the end of April, the whole covered with a conical lid. Here the honey is obtained by means of the glasses or caps, and this is generally the best honey. Put in each glass a bit of the purest of the last years' comb, attached to a thin lath one inch wide, and the length of the glass. Fasten the comb to the top of the glass, by warming the end with a candle or hot iron. Two or two and a half pounds of the very finest honey are thus frequently obtained in a day. All light must be carefully excluded; when the bees want any, they will take it for themselves out of doors. If in July or August the hive is strong enough to bear a further deprivation, the way (with one hive) is to fumigate the bees, and cut out some of the combs. The best material for *fumigation* is the lycoperdon, or great puff ball, which is also known among the peasantry by the names of frog-cheese, mully puff, and punk-fist. This grows as large as a child's head. It should be gathered in dry weather, and exposed to the sun's, or to artificial, heat, until it turns brown and leathery. Many convenient modes of application will occur in practice. Mr. Cotton's is good. Get made or make a little tin box fitted to the nose of your bellows, big enough to hold a piece of the fungus twice the size of an egg, and having two openings, one for the bellows, one for the passage of the smoke. Light the fungus, and when it burns freely put it into the box; put the box on to the bellows-nose, place the latter against the entrance to the hive, and puff away. Have a little wet clay to stop up the entrance on each side of the box, so that none of the smoke may escape. Presently you will hear the bees falling thick as hail, after a brief buzz of indignant astonishment, and in about five minutes all will be still. You may then turn up the hive for any necessary operations, including the taking of honey—choose the side combs, so as to interfere as little as possible with the brood in the centre—and be moderate. The bees will speedily recover from their state of insensibility, and set to work to repair the awful ravages you have made. Mr. Pettigrew recommends (possibly as being so much more certainly obtainable when wanted) cotton rags rolled up into the form of a candle. Ether or chloroform will, perhaps, be better than either, but the experiments do not yet appear to have been sufficiently numerous for one to speak with confidence. We are bound to observe that it is possible that fumigation is not so perfectly harmless as is supposed, and therefore should be done without as far as possible. We have heard nothing from the bees as to their feelings and opinions on the matter.

By adding one or more hives or boxes to the top of the original or stock hive, in technical language super-hiving, or doing the same beneath, which is

called nadir-hiving, or attaching them to the sides, which is known as the collateral system, such important additional advantages are obtained that no one should be without spare hives or boxes ready to be used when required, even if they do not at the outset fit up a complete apparatus. Thus,

2. A spare box or hive will be ready to receive a swarm obtained in the ordinary manner, with all its picturesque but inconvenient accessories, as long watchings to know the moment of swarming; long runnings, perhaps, to overtake the vagrant young colony, over hill and valley, brake and brier, and amid interminable ear-splitting tumult, which the bees have the bad taste, it is supposed, to like; and the race often ending in seeing the whole cluster safely deposited in a neighbour's apiary, who swears it went from his hive. If you wish to avoid all that kind of thing, do your best to give the bees no motive for such wanderings, and every conceivable reason to stay where they are. Put a decoy hive ready, with a delicious piece of comb in it (an old hive, with its own combs, will be still more attractive), and it is most likely the scouts sent out to explore will return with such a glowing account of the land of milk and honey they have discovered, that the swarm will be impatient to be off and take possession.

3. Adopting as a rule the non-disturbance in any serious way of your stock-hive, so that honey and brood shall there at least flourish together, when you think it is full (a solid sound from the hive, and a great long-continued buzz from the bees in answer to a tap, is good evidence of that state) attach your side-box, open the communication, and make the bees enter and exit by the entrance to the side-box, which you will do by closing up the entrance to the other, at night when the bees are all at home. A little piece of comb fastened at the top of the side-box, may be at once a useful hint and a temptation to the bees. This box is to be kept solely for honey-combs by ventilation, which prevents the queen from laying eggs in it. When the heat in the side box is 70° you should admit air through the top by means of a piece of tin pierced with holes. A draught through the hive, from the entrance to the roof, now takes place. This must not be done until you see the bees have fairly passed the Rubicon, and have done and ventured too much to be inclined to retreat to the stock-hive. When the box is full you can take it away, and replace it emptied, or by another, or by opening a communication to a similar side box on the opposite side, as in Mr. Grant's hive. The bees in it will soon flock to the queen in the parent hive. This arrangement prevents swarming, or at least has a great tendency to prevent it; as the bees have more room given to them just when they want it. It also raises the stock itself to the highest state of prosperity, as only the

surplus honey is taken away, and the brood is not interfered with.

4. But if you wish to have an increase of stock without the inconvenience of natural swarming, you may easily do so by treating the side box exactly the same as the chief one, that is, by leaving it unventilated. Brood, as well honey, will then be deposited in it, and you have only to watch for a favourable opportunity of securing two stocks. This should be a little before the natural period of swarming, of which the signs are, clustering on the outside, activity and commotion among the drones, inactivity of the workers, portentous silence in the hive in the day (during which the prudent bees are supposed to be filling their pockets with provisions for their journey), and a singular humming noise at night, presumed to come from the young queen-bees announcing their advent. But these warnings apply less to the first than to the subsequent swarms. However, there is a pretty good rule for effective action. As soon as you find the side-box is nearly full, watch for an opportunity when the queen, with about two-thirds of the bees of the colony, is in the side-box, then cut off the communication with, and remove the parent-hive three or four feet distance, and put an empty hive in its exact position. The returning bees will flock into the side-box as before, and that hive is done with. As to the parent-hive, the nurse-bees will take every care of the brood in it; in fact, they will be just as though a swarm with the queen had left them; and will proceed with due equanimity to supply her place in the approved way. This is the mode practised with success by Mr. Grant, and may be varied according to circumstances. For instance, if the queen should *not* have been left in the side-box with the greater portion of the bees, and has, therefore, been removed with the parent-hive, the result must be, in effect, the same, as regards the two hives; most of the bees then might leave the side-box and flock to the queen in the parent-hive; but if there be brood in the side-box, it appears the nurse-bees will not desert it, and, therefore, there are still two communities, and both well provided with all they require for a new start in life.

5. There is also practised, it is said with great profit, a more summary way of proceeding to make an artificial swarm, which consists in fumigating the bees, in order to divide them into two bodies as before. The period chosen is from the beginning of May to the middle of July, and when there are as many bees on the board at the bottom as will fill a thirty-two (8½ inches by 6) sized flower-pot. To ascertain this, blow a little smoke into them and turn up the hive. Before commencing operations, place the hive intended for the new colony on the stand, with a bit of comb in its roof, and a stick across the middle to aid in the support of the

combs. If you are short of hives, this one may be used instead of an additional empty hive in performing the operations about to be described. But the bit of comb may be somewhat in the way. The bees having been stupified by the fumigation, the hive is turned up, its top rested on the ground, and an empty hive placed over it of the exact same shape (at the edges at least), and a cloth tied round the circle of junction. Then tap or drum gently at the sides of the two hives, for about ten minutes, in which time probably about two-thirds of the bees will have ascended into the upper hive. The queen, fortunately for the operation, is generally one of the first either to run away from or to confront the danger (we know not which it is) by ascending. If your hive have a glass window, as all should have, you can see when about the right proportion have ascended; if not, you must guess with the aid above given of the knowledge of the ordinary duration of time occupied. Now take off the top hive and reverse it also on the ground, while you make sure the queen is there, throwing, meanwhile, the cloth (that you have removed) over the exposed bottom of the parent-hive. If the queen be there (and, as we have shown, page 610, she is easily distinguishable) you have only to shake queen and bees into the prepared hive on the board, and restore the parent-colony also to the ordinary resting-place, where the bees will soon rear a new queen for it. If the queen be not there, then repeat the process with the prepared hive, and so you will catch her at last. You can then return the first batch of bees that were removed either to the parent-hive or to the prepared hive, by simply shaking them into the one which most needs them.

Old hives thus deprived of their queens, and made to rear new ones, involve another important advantage. In twenty-one days the entire brood will be reared, no fresh brood having been deposited (through the absence of an old queen) and the young queen not having begun to lay, which they do in about ten days after they leave the cell. Here then, where the hives are heavy, say forty or more pounds in weight, is an opportunity of removing the bees (by fumigation) into a new hive, and selling the contents of the old one. The honey is thus earlier than usual in the market, and fetches a higher price. Weak swarms should invariably be joined either to strong ones, or to each other, and as soon as possible after swarming. It is only a strong community that can so successfully establish themselves before winter, as to be in no danger from its severity. This junction may be performed by fumigation, and taking away one of the queens. A stock without a queen may by the same means be added to one that is more fortunate: and this applies even to the restoration of a swarm to its own parent-hive if there be ample room in it.

We have said nothing of the plan of annually destroying the bees, for it is almost an insult to the readers of the *Farmer's Library* to suppose they would approve of so senseless and unprofitable as well as cruel a practice. It is quite true that thus all the honey that is made in a season may be obtained at once, just in the same way that all the golden eggs of the goose in the fable were to be obtained at once. And if this wholesale deprivation be desired, it is perfectly obtainable without destroying the bees, by simply fumigating them, and removing them to another hive. And if you don't choose to feed the bees during the winter, let somebody else have them that will. It is possible, in a favourable late season, they may not need any assistance. At all events, let it be the golden maxim of bee-management never to allow a single bee to be injured if you can help it.

BEE-DRESS.

And now, lastly, as to the chances of the bees injuring *you*. All apiarians agree that there is no danger worth consideration when the bee-habits and temper are duly understood and respected. Treat them as dangerous creatures, as, for instance, by keeping them too remote from intercourse with human society, and they will soon justify your caution. But then it is you who have created the fierceness they will exhibit. Bees don't like people to come in rude *perspirations* betwixt the wind and their nobility; and, as before pointed out, they have a particular objection to your breathing upon them. It is well, however, to feel safe, as well as know you ought to consider yourself so, not only for your own sake, but for the greater ease of all your operations. Therefore, wear a bee-dress at all such times, until, at least, experience says you may do without it. One of our fair readers will invent and make a good bee-dress, sooner, perhaps, than we can describe one, so simple are its requisites. Gloves to fasten at the wrists over the sleeve, a large Scotch gauze-veil covering the hat, and brought down tightly over its projecting brim, fastened tightly round the neck beneath, upon the turned-up coat-collar, and covering the top of the closely buttoned-up coat, with an apron and Wellington boots, or a thick pair of woollen-socks or stockings, worn over the usual ones, comprise an excellent system of defence. It will, however, be necessary to stitch a piece of thick cloth upon the veil at the part that covers the projecting nose and chin, so as to cover the whole of that region, leaving the eyes alone at liberty to look over the wall, safe under the protection of the hollow made by the hat's brim. Thus attired, the apiarian may perform in entire peace of mind the most delicate operations, and be freed from all danger of becoming the actor in some new scene as interesting and dramatic, but also as alarming and dangerous,

as that described by Thorley, which we transcribe for the reader's edification, and with which we conclude.

"In or about the year 1717, one of my swarms settling among the close-twisted branches of some codling-trees, and not to be got into an hive without more help, my maid-servant, hired into the family the Michaelmas before, being in the garden, very officiously offered her assistance, so far as to hold the hive while I dislodged the bees, she being little apprehensive of what followed.

"Having never been acquainted with bees, and likewise afraid, she put a linen-cloth over her head and shoulders, concluding that would be a sufficient guard, and secure her from their swords. A few of the bees fell into the hive; some upon the ground; but the main body of them upon the cloth which covered her upper garments.

"No sooner had I taken the hive out of her hands, but, in a terrible fright and surprise, she cried out the bees were got under the covering, crowding up towards her breast and face, which immediately put her into a trembling posture. When I perceived the veil was of no further service, she at last gave me leave to remove it. This done, a most affecting spectacle presented itself to the view of all the company, filling me with the deepest distress and concern, as I thought myself the unhappy instrument of drawing her into so great and imminent hazard of her life, which now so manifestly lay at stake.

"It is not in my power to tell the confusion and distress of mind I was in, from the awful apprehensions it raised; and her dread and terror in such circumstances may reasonably be supposed to be much more. Every moment she was at the point of retiring with all the bees about her. Vain thought! to escape by flight. She might have left the place indeed, but could not the company, and the remedy would have been much worse than the disease. Had she enraged them, all resistance had been vain, and nothing less than her life would have atoned for the offence. And now to have had that life (in so much jeopardy) insured, what would I not have given!

"To prevent, therefore, a flight which must have been attended with so fatal a consequence, I spared not to urge all the arguments I could think of, and use the most affectionate entreaties,

begging her, with all the earnestness in my power, to stand her ground, and keep her present posture; in order to which, I gave encouragement to hope, in a little space, for a full discharge from her disagreeable companions; on the other hand, assuring her she had no other chance for her life. I was, through necessity, constantly reasoning with her, or else beseeching and encouraging her.

"I began to search among them for the queen, now got in a great body upon her breast, about her neck, and up to her chin. I presently saw her, and immediately seized her, taking her from the crowd, with some of the commons in company with her, and put them together into the hive. Here I watched her for some time, and as I did not observe that she came out, I conceived an expectation of seeing the whole body quickly abandon their settlement; but instead of that, I soon observed them, to my greater sorrow and surprise, gathering closer together without the least signal for departing. Upon this I immediately reflected, that either there must be another sovereign, or that the same was returned. I directly commenced a second search, and in a short time, with a most agreeable surprise, found a second or the same; she strove, by entering further into the crowd, to escape me, which I was fully determined against; and apprehending her without any further ceremony, or the least apology, I re-conducted her, with a great number of the populace, into the hive. And now the melancholy scene began to change and give way to one infinitely more agreeable and pleasant.

"The bees, presently missing their queen, began to dislodge and repair to the hive, crowding into it in multitudes, and in the greatest hurry imaginable. And in the space of two or three minutes the maid had not a single bee about her, neither had she so much as one sting, a small number of which would have quickly stopped her breath.

"How inexpressible the pleasure which succeeded her past fears! What joy appeared in every countenance upon so signal a deliverance! and what mutual congratulations were heard! I never call to mind the wonderful escape without a secret and very sensible pleasure. I hope never to see such another sight, though I triumph in this most noble stand and glorious victory."

THE END.

INDEX TO THE SHEEP.

- ABRUZZEZE**, the, 58.
Abruzzi, account of the, extracted from the *Penny Magazine*, 58; sheep of the, 59; management of, 59.
Aeari, history of the, 208.
Acosta, his account of the paco-llama, 156; of the tame guanaco-llama, 156.
Africa, North, various breeds of sheep in, 42; fat-tailed sheep of, 42.
African sheep crossed with Spanish by Columella, 44; by Pedro the Fourth of Spain, 45; by the Cardinal Zimenes, 45.
Afric of Canterbury, his representation of a shepherd's duties, 32.
Age, natural, of the sheep, 76; manner of ascertaining the, 74; not calculated from the time of birth, 74; the average, at which sheep are killed, 76.
Albemarle, the Earl of, details given by him of the superiority of the Southdown to the Norfolk sheep, 114.
Aloes, 216.
Alpaca, the wild, 158.
Alteratives and specific medicines, nature of, 216.
Alum, 218.
America, North, breed of sheep in, 73; South, breed of sheep in, 73.
Ammotragus, the genus, 20.
Anacharsis the younger, his remarks on the practice of clothing sheep, 10.
Ancients, the, their knowledge of the effect of rich pastures in the deterioration of the wool of sheep, 78.
Andalusia, sterility of a portion of the flats of, 57.
Anderson, Dr., his account of the lambs of Bucharia, 34; of a fine combing wool produced in the Shetland Isles, 121.
Anglesey, the true sheep of, 107; the old breed of sheep of, 107; cross between the, and the Cotswolds, 107; between the, and the Leicesters, 107; between the, and the Merino, 107; between the, and the black-faced sheep of the Peak of Derbyshire, 107; between the, and the Southdown, 107; between the, and the white-faced Yorkshire sheep, 107.
Anglo-merinos, disadvantages of the, 70; triumph of the, in 1810, 70; prices given for, at various periods, 70.
Anglo-Saxons, wool manufacture of the, 145.
Angora-Thibet goats, the, purchased by Mr. Riley of M. Polomeau, 163.
Angular, or cheek vein, method of bleeding from the, 174.
Animal heat, the physiology of, 172; the source of, 172.
Animals, domestic, tendency of, to return to their type, 29.
Ansbach, sheep imported into, 62.
Antispasmodics, 217.
Aorta, the, of the sheep, 173.
Aoudad, the (see *Ovis Tragelaphus*).
Aperient, injections, the composition of, 216; a good, in dysentery, 191.
Aperients, the best, for sheep, 216.
Apoplexy, or blood-striking, the sheep most liable to, 181; often caused by high feeding and over-driving, 181; symptoms of, 181; treatment of, 181.
Arabs, mutton furnished by, for the consumption of Syria, 38.
Arcadia, the sheep of, 45.
Argali, character of the, 25; description of the 24; the great Asiatic (*Ovis Ammon*), 24; specimens of the, in the British Museum, 24; Caucasian, Colonel Hamilton Smith's account of one, 25; the Circassian, Mr. Blyth's remarks concerning, 25; the Kamtchatkan (*Ovis Nivicola*), 26; the Kamtchatkan, Kotzebue's account of, 26; the Kamtchatkan, description of, 26; the Siberian, supposed by Mr. Bennett to be the origin of the Asiatic races of sheep, 19.
Arlington long wool sheep, the, 73.
Arran, the sheep of, 119.
Arterial and venous system of the sheep, 173; pulse, the, in the adult sheep, 173.
Artificial food, advantages of, 165; routine of, for the Southdown sheep, 166.
Astringent cordial, a useful, for sheep and calves, 218.
Astringents, nature of, 218.
Attica, ancient, the wool of, 45.
Auchenia, the genus, 155; various species of, 156.
Aulnagers, what, 153.
Australia, important position of, among the wool-growing countries, 72; average market-price of the wool of, 72; statistical account of exports of wool from, 72; introduction of the Merino sheep into, 72; results produced by crossing the Merino sheep with the native breeds of, 72; importation of Southdown and Leicester sheep into, 72; introduction of Saxo-Merino sheep into, 72.
Australian colonies, attention of, to the growth of wool, 163.
Austria, sheep, number of, 62.
Azores, sheep of the, 30.
BAIREUTH, sheep imported into, 62.
Bakewell, Mr., his plan of proceeding until he established the celebrated Dishley breed, 124; the principles on which he selected sheep for breeding, 124; his plan of letting out rams for the season, 125; ultimate triumph of, 125; his plan of fattening sheep rapidly, 193.
Ballinasloe fair, account of, 142; manner of conducting business at, 142; average number of cattle exhibited at, 142; sheep sold at, in 1836, number and price of, 142; summer fair, description of the, 142.
Bampton sheep, the, 100; description of the, 133; the old, disputed origin of the, 133; the new, 133.
Banks, Sir Joseph, his advocacy of the introduction of the Merino sheep into England, 67.
Banstead-Heath sheep, the, 96.
Bartley, Mr., his account of Dr. Parry's breed of sheep, 69.
Basal, the, and apical portions of each filament of wool exceed the intermediate portion, 15; cause of this, 16.
Bath and West of England Society, opinion of the, concerning Dr. Parry's experiment, 69.
Bearn, breed of sheep in, 66.
Bedfordshire, the sheep of, 115.
Bedouin sheep, the, 37.
Belgæ, the, 145.
Bell, Mr., his manner of accounting for the difference between the hair of the mouflon and the domestic sheep, 21.
Bengal, sheep of, obtained by the early colonists of Australia, 72.
Bents, 169.
Berkshire sheep, the old breed of, 96; the Southdown sheep in, 96.

- Bicheno, Mr., his account of the Burrhel in the museum of the Zoological Society, 23.
- Bible, passages in the, proving that sheep in the East were anciently folded, 8; mention of sheep-shearing in the, 9; passages in the, alluding to the dyed cloth, and fine-woolled sheep of Tyre, 44; passages in the, illustrative of the value attached to goat's hair, 161.
- Black-faced, or short sheep, the, 111; improvement in the, 112.
- Black-muzzle, 201.
- Blain, or gloss-anthrax, causes of, 200; symptoms of, 200; treatment of, 200.
- Blankets, what made of, 155.
- Bleeding, various methods of, 174; the first faltering of the arterial action should be carefully watched in, 174.
- Blood of the sheep, small quantity of, in proportion to its weight, in comparison to that of other animals, 174; quantity of, to be taken from the sheep, 174.
- Blue vitriol, or sulphate of copper, 219.
- Blyth, Mr., his description of the genus *Ammotragus*, 20.
- Boggy land, practice of draining the, in the Scotch mountains, 119.
- Bombazeen, what, 155.
- Bourg, migrations of the sheep of the plain of, 66.
- Brahmin bull of the Zoological Gardens, the, quelled by a ram, 85.
- Brain of the sheep, size of, compared with that of the ox, 173.
- Braxy, what, 187; dry, what, 187; causes of, 187; symptoms of, 187; treatment of, 188; appearances on dissection after, 187; water, what, 187; causes of, 189; treatment of, 189; appearances upon dissection after, 189.
- Breaches of the filament, nature and cause of, 14.
- Brecknockshire, the mountain sheep of, 106.
- Breed, the influence of, 34; the plan for improving an indifferent, 79.
- Breeder, rules for the, 78; a Lincolnshire, his account of the average price of the long-woolled Lincolnshire sheep, 79; fleece of the, 79.
- Breeders, usual aims of, 124.
- Breeding, 215; principles of, 77; good effects of a judicious cross in, 79; importance of healthy sheep for, 80; in-and-in, effects of, 79.
- Breeds, various, of sheep, difference of, in external form, 76; European, importance of improving the, 34.
- Bridges, the practice of erecting over brooks in the Scotch mountains, 119.
- Brinse, what, 48.
- Britain, sketch of the history of, from the arrival to the final departure of the Romans, 145.
- British Association for the Advancement of Science, discussion concerning the importance of attempts to naturalize the llama, held at the ninth meeting of the, 159.
- Britons, the ancient, certainly possessed sheep, 31.
- Broad-cloths, plain, what, 155.
- Bucharia, sheep of, description of the breed of, 39; celebrated lambskins of, 34.
- Burchell, his account of the Cape sheep-skin, 39.
- Buckinghamshire, the various breeds of sheep in, 115.
- Buffon, his remarks on the moral distinctions between sheep and goats, not applicable to the wild species of either genus, 17; his remarks on the domestic sheep, 29.
- Burchell, his picture of a cavalcade of Hottentot shepherds with their flocks, 39.
- Burrhell, the, description of, 23.
- Butyr of antimony, 219.
- CAERMARTHENSHIRE, the sheep of, 106.
- Caernarvonshire, the sheep of, 107; little attention paid to, 107.
- Cæsar, Julius, no mention made of British sheep or wool by, 144.
- Californian sheep, description of the, 29; manners of the, 29.
- Calomel (submuriate or protochloride of mercury), 192, 216.
- Calves' and sheep's cordial useful in palsy, preparation of, 185.
- Camargue, migrations of the sheep of the, 66.
- Camel, the, possibility of introducing into Australia, 160.
- Canal of the foot, the results of neglected inflammation of the, 204; disease of the, called foot-rot, 204; treatment of, 204; operation of dissecting out the, 204.
- Cannæ, the plains of, 59; in the time of the Romans, 59; at the present time, 60.
- Cannock Heath sheep, description of the, 104.
- Cape of Good Hope, supplies of wool from, to Great Britain, 72; sheep, description of the, 39; management of the, 39; mutton, quality of the, 39.
- Caraway-seeds, 218.
- Carbonate (subcarbonate) of ammonia, 218.
- Carpet manufactures, 154.
- Carr, Mr., his account of the Escorial breed of Merinos, 63; of the Infantado, or Negretti breed of Merinos, 62; of the Saxon or Merino sheep, 62.
- Cashmere, what made of, 155; shawls, the texture of, 161; different processes of manufacturing, 162; expense and trouble attending the transmission of, to Europe, 162.
- Castration, the operation of, 213.
- Carbonate (sesqui-carbonate) of soda, 218.
- Catarrh, epidemic, or influenza, symptoms of, 198; common symptoms of, 197; treatment of, 198.
- Catechu, 218.
- Caustics, 219.
- Cerebellum, the, 176.
- Cerebrum, the, 176.
- Chalky-ground, deterioration in the wool of sheep fed on, 15.
- Challis, what, 155.
- Charge, Mr., his attempts to improve the long-woolled sheep of Northumberland, 127.
- Cheshire, not a sheep district, 104.
- Cheviot breed of sheep, the, 110; description of the, 77; characteristics of the, 110; superiority of the, to the black-faced breed with respect to feeding, 118; recent increase of the, in Scotland, 118; cross of with the Leicester breed of sheep, 110; cross of, with the South-downs, 118; wool of the, 110, 111; superiority of, to that of the black-faced breed of sheep, 118.
- Chichester, fair for sheep at, 96.
- Chinese breeds of sheep, 40; Tartary, sheep of, 40.
- Chloride of lime, an invaluable disinfectant, 218; taken internally, 218.
- Chunah breed, the, produced in Spain, 33; wool of the, 53.
- Clarke, Mr., of Canwick, sheep of the cross breed between the Lincolns and Leicesters exhibited by him, 130.
- Clayworth, Mr., his account of the symptoms and treatment of epidemic catarrh, 198.
- Climate affects the proportion of the wool to the hair, 33.
- Clothing lambs, practised by the inhabitants of the Ukraine and Podolia, 10; sheep, not practised either by the Israelitish or Italian shepherds, 10.
- Clover, considered as an article of food for sheep, 94.
- Clun district, old breed of sheep in the, 103.
- Coarse herbage, the practice of mowing down in the Scotch mountains, 119.
- Cock's foot grass, round-headed, or rough, 168.
- Cœnurus cerebialis, the, 177; form of the, 177; reproduction of the, 177.
- Colic, symptoms and treatment of, 189.
- Colour, tendency of sheep to revert from white to a dark, 10.
- Commerce, one of the grand agents of civilization, 92; in woollens, in England, of the year 1354, 149.

- Common salt (chloride of sodium, or muriate of soda), 216.
 Constipation of the bowels, in the lamb, cause and treatment of, 215.
 Consumption, or phthisis, what, 199; sheep transported from a warm to a colder climate much more subject to, than others, 200; symptoms of, 199; the progress of, 199.
 Conybeare and Phillips, their description of the Mendip range of hills, 100.
 Coquo, the, of Angola, Congo, &c., description of, 41.
 Cordials, 218.
 Corn, crowfoot, poisonous, 202; best antidote for, 202.
 Cornwall, the old breed of sheep in, 102; sheep of, change in the character of the, 102.
 Corrosive sublimate, 219.
 Cortical substance in the brain of the sheep, proportion of, to the medullary, 173.
 Cossacks, their manner of travelling with their flocks, 46.
 Cotes, the ancient, of the hill district of Gloucestershire, 133.
 Cotswold Hills, the, 133; sheep, characters of the old breed of, 135; refutations of the theory of its having formerly been a short-woolled breed, 135; farmer, management of his breed by the, according to the nature of his pasturage, 135; old breed, cross of, with the Leicesters, 135; rather modified by, than absorbed into the Leicesters, 135; importation of, into Spain, 134; sent from England to Spain in 1464, 52; could not have been intended to mix with the Spanish Merinos, 52; wool required by Dom Duarte, king of Portugal, for the manufacture of cloth of gold, 53, 134; the cross-breed, extensively employed in the improvement of other breeds, 135.
 Cottagh sheep, the characters of, 139; attempted cross of, with the Merinos, 139; intermixture of, with the Southdowns, 139.
 Coughing sheep should be slaughtered while yet in good condition, 199.
 Covered buildings for sheep, utility of, in mountain districts, 88.
 Crape, common, what, 155; Norwich, what, 155.
 Crested dog-tail grass, 169.
 Crêpe de Lyons, what, 155.
 Cretan sheep, the, see Wallachian sheep, 35.
 Crimea, sheep of the, 46; management of their sheep, by the Tartars of the, 46; manner of shearing the sheep of the, 46; the gray lambskins of the, 46.
 Crossing, necessity of caution in, 79.
 Cruithne, the, early occupiers of Ireland, 138.
 Cuckoo lambs, 213.
 Culley, Messrs., labours of the, on the farm of Fenton, near Wooller, 127; Mr., his account of the Dishley breed of sheep, 124; of his mode of managing his Dishley Leicesters, 128; of the origin of the term *Herdwick*, 109; of the Lincoln sheep, 130; of the old long-woolled Lincolnshire sheep, 79; his ideas concerning the old dun-faced breed of sheep, 112; his opinion of the Irish long-woolled sheep, 139; his remarks on dentition, 75; on mountain sheep, 111.
 Cumberland, the sheep of, 109; black-faced sheep of, 77; flocks of the Leicester sheep established in, 110; sheep, the cross breeds of, with the Herdwick breed, 110.
 Custom, the ancient, of giving names to sheep, not yet extinct, 4.
 Cuvier, his distinction between sheep and goats, 17.
 Cyprus, the sheep of, 45.
 DANSON, MR., his arguments for the propagation of the llama in England, 159.
 Darby, Mr., his account of his experience in epidemic catarrh among sheep, 198.
 Dartmoor sheep, the, 100.
 Darwin, Mr., his account of the wild guanaco, 157.
 Daubenton, M., his attention to the improvement of sheep in France, 64.
 Dawson, Mr., of Witheall, extraordinary sheep of the cross-breed between the Lincolns and Leicesters killed by him, 130.
 Delamere breed of sheep, description of the, 104.
 Delille, the Abbé, his description of the sheep-dog, 6.
 Denbighshire, the sheep of, 106.
 Denmark, the sheep of, 49; the wool trade of, 49; the introduction of the Spanish Merino into, 63.
 Dentition of the sheep, similar to that of the ox, 74; similar to that of the goat, 18.
 Derbyshire, the polled sheep of, crossing of, with the Leicesters, 113; rapid progress of the long-woolled breeds of sheep in, 113.
 Desmarest, M., his account of the commonest breed of sheep found in Guinea, 41.
 Devonshire, table of the principal breeds of sheep prevalent in, 101; the mountain-sheep of, 101; practice of crossing them with the Leicesters, 101; little progress of the Southdown sheep in, 101; quantity of long-wool grown in, 100; woollen manufacturers in, 154.
 Diarrhœa, 190; causes of, 190; treatment of, 190; in the lamb, causes, symptoms, and treatment of, 214.
 Digitalis, 217.
 Dike, Mr., his flock of sheep, advantages derived from the introduction of Southdowns into, 97.
 Diseases of sheep, 172.
 Dishley Society, establishment of the, 125; rules of the, 125; breed, the little attention to the wool of the, 126; characteristics of the, 77; wool sacrificed to carcase in the, 78; introduced into Northumberland by Mr. Culley, for a time eclipsed by a Lincolnshire breed, 128; ultimate triumph of the, in Northumberland, 128; ram, selection of a, for a breeding stock, 125; for wethers, 125.
 Distension of the abomasum with curd in the lamb, 215; causes, symptoms, and treatment of, 215; of the rumen with food, see Hoove.
 Dog, dependence of sheep upon the, in districts where wolves abound, 84.
 Dorking, 214.
 Dorsetshire, the pure breed of sheep of, 97; account of the, 97; description of the, 98; management of the, 98; kept in many parts of Sussex, 95; in the vicinity of Petworth, management of the, 95; grass lambs of the, fed in the vicinity of Petworth, 95.
 Dose of medicine, proper size of a, for a sheep, 216.
 Downs of Sussex, general character of the, 93; extent of the, 93; height of the, 93; number of sheep fed on the, 94; breed between the sheep of the, and the Dorsetshire, 99.
 Drafting off, the practice of, 215.
 Drainage, thorough, importance of, in a sheep farm, 195.
 Dressings, the best, 219.
 Dropsy, common, symptoms, and treatment of, 189; acute, see Water-braxy.
 Dukhun, goats of the, 40; sheep of the, 40.
 Dun-faced sheep, old breed of, description of the, 112.
 Durham, various breeds of sheep in, 112; short-horned cattle of, treatment of the, 78.
 Dysentery, various cases of, quoted by Mr. Hogg, 191, 192; causes of, 191; treatment of, 191, 192; serviceable mixture for, 217.
 East Riding of Yorkshire, breed of sheep of the, 113.
 Edward III., his attention to the commercial interests of England, 147; IV., statutes of, for putting down machinery, 149.
 Egyptian sheep, character of the, 38; management of the, 38.
 Elasticity, one of the most valuable properties of wool, 15; of staple, what, 15.
 Ellis, Mr., his account of the Lincoln sheep, 129.

- Ellman, Mr., his Southdowns, high prices at which they sold at various periods, 95; his account of the improvement in the Southdown sheep, 94.
- England, tardiness of, in naturalizing the Merino breed of sheep, 67; reasons for, 67.
- English sheep, great desiderata in, 70; abundance of, in the twelfth century, 146; long-woolled, naturalization of, in France, 65; wool, recent deterioration in, 78.
- Enteritis, or inflammation of the bowels, 190; comparison between, and acute dropsy, 190; symptoms of, 190; treatment of, 190; appearances presented on dissection after, 190.
- Epidemic plague, or pestilence, 210; symptoms of, 211; treatment of, 211.
- Epilepsy in various animals, causes of, 184; symptoms of, in the sheep, 184; treatment of, 184; mode of checking a fit of, in some parts of England, 184.
- Epsom salts (sulphate of magnesia), 216.
- Ergot of rye, 217.
- Erzeroum, supplies of sheep imported to Syria from, 38.
- Escurial breed of sheep, the, what, 63.
- Esquileos, what, 56.
- Essex, various breeds of sheep in, 115; woollen manufactures in, 154.
- Estremadura, sterility of a portion of the flats of, 57.
- Ethmoid bone, the, 176.
- Ewe, a bereaved, transfer of affection of, to a stranger lamb, 81; adoption of a stranger lamb by, not connected with any false supposition, 82; boldness of the, in defence of her lambs, 82; devotion of the, for her young, marvellous tale of the, 82; numerous anecdotes relating to the, 82.
- Ewes, care taken of, in Sussex, at the yeanning time, 94; young, preferred by the Sussex breeders, 94; maternal affection of, 81.
- Exmoor sheep, the, 100.
- Experiments made by Mr. Robert Smith concerning the best food and management for sheep, 169, 170.
- External applications, 218.
- Eye of the sheep, description of the, 90.
- Farmer, the, should attend to the slightest symptom of disease in his live-stock, 204.
- Fat, propensity of the new Lincolnshire sheep to accumulate, disadvantage of the, 130; tailed sheep, the (*Ovis Aries*), different breeds of, 37.
- Feeder, the sheep, low gains of, 118; importance of wool to the, 118.
- Felting of wool, the art of, known to the Egyptians, 3; the process of, 12; various theories upon, by which writers have endeavoured to account for it, 10; in woven fabrics, 13; produced in flannel by washing, 13.
- Female sheep, various names of, at different periods of her life, 74.
- Femoral artery, position of the, 174.
- Ferdinand King of Portugal, law made by him concerning sheep-keeping, 57.
- Feroe Islands, sheep of the, 30.
- Fescue grass, hard, 168; meadow, 169; sheeps', 168; Welsh, 163.
- Fever, symptoms of, 185; treatment of, 185; in the lamb, treatment of, 215; inflammatory, 185; symptoms of, 185; treatment of, 186; medicine, good mixture for a, 217.
- Fezzan breed, the, described by Shaw as the Sahara sheep, 42; diet and management of, 42; specimen of, in the Zoological Gardens, 41.
- Fibre of wool, appearance of when viewed as a transparent object, 11; when viewed as an opaque object, 11.
- Fina wool, what, 56.
- Finden, fair for sheep at, 96.
- Fleece, the, of the sheep, a self-registering thermometer, 16; of short-woolled sheep, usually divided into ten lots, 15.
- Flemings, arrival of, in England, in 1337; 148; cultivation of the woollen manufacture by the, 147.
- Flintshire, the sheep of, 106.
- Flocks, management of, in some parts of France, 5; general routine of the management of Leicester, 166.
- Fluke, form of the, 194; various opinions concerning the, 193.
- Fly, the, 209; treatment of, 209; powder sued for, 209.
- Flying stocks, what, 215.
- Folding sheep at night, associates should not be separated in, 84.
- Fomentations, 219.
- Foot-rot, the true progress of, 205; treatment of in the outset, 205; some breeds of sheep more liable to it than others, 206; disputed question whether infectious or not, 205; proof of the non-contagion of, 206.
- Foxes, annoyance of, to the sheep of Iceland, 51.
- Fractures, 211; treatment of, 211.
- France, not a great sheep country, 67; measures taken to establish a pure long-woolled breed of sheep in, 65; introduction of Spanish Merinos into, by Colbert, 64; importation of Spanish Merinos into, by M. de Perce, 64; limited spread of Merinos in, 65; causes of, 65.
- Fraser, Mr., his description of the mouflon, tenanting the mountains in the neighbourhood of Nishapore, 22.
- Frederick the Great, his attention to the improvement of agriculture, 61; his importation of Spanish sheep into Prussia, 61.
- French Republic, means taken by, for the improvement of sheep in France, 64; purchase of Spanish sheep by, 64; Merinos, average value of, at various periods, 64; wool, average price of, at various periods, 64.
- Frontal bones, the, 175; description of the, 175; sinuses, nature of the, 176.
- GAD-FLY, disease caused by, 176.
- Gall-lamb, treatment of, 213.
- Garget, or inflammation of the substance of the udder, 209; symptoms and treatment of, 210.
- Gascony, breed of sheep in, 67.
- Gemmules of the hydatid, the, 177.
- Gentian, a good tonic, 217.
- George III., importation into England of a flock of Spanish Merinos by, 67.
- German Merinos, attention required by the, 63; wool, the, 63.
- Gestation and parturition, 211.
- Ghoral, Mr. Hodgson's account of the, 18.
- Ginger, a cordial, 218.
- Glamorganshire, general character of, 105; characteristics of the native sheep of, 105.
- Gloucestershire, divisions of, 133; old breed of sheep in, 103; present breed of sheep in, 103; the woollen manufactures of, 153.
- Goat, early history of the, interwoven with that of the sheep, 9; the, much modified by domestication, 17.
- Golden Fleece, description of the endeavours of Edward III. to make England a wool-manufacturing country, given in a curious book entitled the, 147.
- Goodman, Mr., his account of the present employment of the English short wools, 92.
- Gohier, M., his experiments concerning the contagion of the foot-rot, 205.
- Graham, Mr. John, preparation used by, for smearing sheep, 220; mixture for smearing sheep, recommended by, 89.
- Grass, hair, melic, and cotton, 169.
- Grasses, the principal, which compose the pasture-lands of Great Britain, 168.
- Great Britain, table of wool exported to Norway from, 49.
- Great-head, disease described by Mr. Hogg under the name of, 200.
- Grecian method of making cheese, 45; sheepskin finds a ready sale in the islands of the Greek Archipelago, 46; sheepskin, the price of, 46.

- Greece, the sheep of, degenerated from their pristine excellence, 45; bad management of sheep in, 45.
- Green-rye, a good spring food for sheep, 94; great caution necessary in giving, 94, 166.
- Gregarious animals, spirit of imitation shown by, 89.
- Guadaloupe breed of sheep, the, what, 63.
- Guanaco, the, curiosity of, 157; llama, journeys of the, 156; tame, description of, 156; wild, locality of, 157; description of, 158; habits of, 157.
- Guienne, breed of sheep in, 67.
- Guilds, forming of manufacturers into, 145.
- Guild, the, of the weavers of London, 146; of the weavers of Oxford, 146.
- Guinea, breeds of sheep in, 41; two varieties of sheep reared in, 34; the sheep of, crossed with Dutch and English sheep, 41; the result, 41.
- Gullet, shortness of the, in the sheep, 202; obstruction of the, treatment of, 202.
- HAIR and wool of various animals, comparison between, 11.
- Hall, Mr., his account of an adventure with a flock of mountain sheep, 85.
- Hampshire, number of sheep reared in, 96; management of sheep in, 96; sheep, average price of, 96; the old crossed by the Southdown, 95; the Southdown sheep in, 96; west country sheep, 96.
- Haran, the well of, used for watering sheep, 7.
- Hawes, Mr. John, case related by him of a number of sheep poisoned by wheat, 203.
- Hearing, acute sense of, in the sheep, 90.
- Heart, the, of the sheep usually felt to ascertain the force of the circulation, 174; liability of, to oppression, 173, 174.
- Hebrides, sheep of the, 119.
- Henry II., statue of, prohibiting the mixture of Spanish with English wool in the manufacture of broadcloths, 146.
- Herdwick breed of sheep, the, 109; singular introduction of, 109; spread of, in Cumberland and Westmoreland, 109; general character of, 109.
- Hereford breed of sheep, wool of, in 1800 and in 1828, 103.
- Hertfordshire, the sheep of, 115.
- Hill district, the, of Gloucestershire, 133; sheep of Wales, recent improvement in the management of the, 106.
- Hodgson, Mr., his table of the differential characters between the genera *ovis* and *capra*, 17.
- Hogg, Mr., his account of the Scotch shepherd's life in winter, 117; of the damage done by a snow-storm in 1794, 88; of the "thirteen drift days in the middle of the seventeenth century," 88; of the superstition of the natives of Cairn Gorm and Lochavon concerning the great-head, 200; of several salves for smearing, 220; of the custom of supplying the place of a lamb to the mother, 81; his anecdote of a bereaved ewe, 83; his directions for the treatment of diarrhoea, 190; operation in the case of hydatids recommended by him, 179; his rules for the prevention of dry braxy, 187.
- Hoof of the sheep, 205; effect of low moist land on the, 205.
- Hoove, or distension of the stomach with gas, treatment of, 202; kind of food apt to produce, 202; danger of, in turnip feeding, 166.
- Hooze, or bronchitis, symptoms of, 197; accompanied with parasitic worms, treatment of, 197.
- Horn, the shepherd's, 5; still used in collecting cattle, 5.
- Hottentots, the, their excellence as shepherds, 39.
- House-lamb, manner of rearing, 98.
- Hungary, the sheep possessions of, 63.
- Huniah or Bhotan domesticated sheep, Mr. Hodgson's account of the, 34.
- Huntingdonshire, the sheep of, 115.
- Husbandry, revolution in, 136.
- Hydatids in the brain, 177; manner of accounting for their presence, 178; the operation of removing, 179; rarely successful, 180; operation in the case of, recommended by Mr. Hogg, objections to the, 180; French operation in the case of, 179, 180; prevention of, 180.
- Hydrocephalus, or water in the head, 180; causes of, 180; symptoms of, 180; plan of treatment recommended in, 180.
- Hydrochloric acid, 219.
- ICELAND, attention paid to the rearing of cattle in, 49; sheep, description of the, 56; management of the, 50; wintering of the, 51; casualties to which they are exposed, 50; sometimes acquire the habit of nibbling each others' fleece, 51; the introduction of Merino sheep from Norway into, 50; the introduction of Spanish rams into, 50.
- Icelander, the, importance of the sheep to, 50.
- 'Illustrations of Natural History,' account of the friendship of a horse and sheep in the, 84.
- Indian breeds of sheep, 40.
- Infantado breed of sheep, the, what, 63.
- Inflammation of the brain, or phrenitis, 181; symptoms of, 181; of the liver, symptoms of, 192; treatment of, 192; of the spleen, 196; treatment of, 196.
- Interdigital pit, the, 203; present in the sheep, but wanting in the goat, 18.
- Intermaxillary bones, the, 175; nasal processes of, 175; palatine processes of, 175.
- Iodine, 217; of potassium, 217.
- Ireland, relics of ancient civilization in, 138; antiquity of flocks and herds in, 138; suitableness of, for the rearing of sheep, 137; little improvement in the sheep of, to be traced to the Merinos, 72; the introduction of the Dishley sheep into, 140; results of, 140; causes of the great exportation of animal food from, 140; wool-manufacture of, at the time of the union with England, 138; wool and yarn exported from, to England in 1772 and 1811, 138.
- Irish lambs, havoc made among by eagles and foxes, 139; sheep, two breeds of the ancient, 139; different management of, in the several districts, 141; importation of, into England, 140; long-woolled, the old, 139; Southdown, partial failure of the, 139; Southdown wool, enormous prices given for at various times, 139; wolf-dog, the ancient, characteristics of, 138.
- Irritation of the skin, treatment of, 209.
- Isle of Man, sheep of the, 122; of Portland, breed of sheep in the, 99; of Wight, number of sheep kept in the, 97; of Wight farmer, importance of early lambs to the, 97; of Wight, sheep of, 97.
- Italian net, what, 155.
- Italy, the migratory sheep and shepherds of, 58.
- JARDINE, Sir W., his account of the adoption of a litter of pigs by a setter bitch, 82.
- Jaubert, Mr., his expedition in search of the genuine shawl-goat, 162.
- Jaw, lower, of the sheep, 74.
- Jenkinson, Anthony, his description of the Persian sheep, 37.
- Jhâral of the Nepâl range of hills, Mr. Hodgson's account of the, 18.
- Jugular or neck vein, method of bleeding from the, 175.
- KABORGHAN, manufacture of posteens at, 40.
- Kalmuc breed of sheep, description of the, 36.
- Kebsch, the, see *Ovis Tragelaphus*.
- Kerman, manufacture of numuds at, 40.
- Kirguise breed of sheep, description of the, 35.
- Kitto, Dr., his account of the migration of a nomade tribe, 7; his observations on the custom of leading instead of following sheep, 5; on the purple cloth of the Peloponnesus, 44.
- Koch, the, see *Ovis Vignei*.
- Korasan, manufacture of numuds at, 40.

- LACHRYMAL bones, the, 175.
 La Cran, sheep of the district of, 66; migrations of the, 66.
 Lamb, the, wool of, 16.
 Lamber, the duties of a, 212; what he should be provided with, 212.
 Lambs, usual time of birth of, 80; disadvantages of too early birth of, 80; of too late birth of, 80; sorting of the, 215; from the breeders, average price of, 118; house, management of, 80; Welsh, the practice of weaning at an early age, 105; objections to this, 105; shearing, Welsh practice of, 105.
 Lambskin, value of, in Tartary, 1; cruel method of procuring it in perfection, 1.
 Lanarkshire, the great nursery of the black-faced horned sheep, 116; management of sheep in, 116; plan pursued in some parts, of pasturing them in the lower districts in the depths of winter, 116.
 Lancashire, the sheep of, 109; the manufactures of, 153.
 Languedoc, breed of sheep in, 66.
 Larva of the gad-fly, form of the, 176.
 Larvæ, of the œstrus ovis, course of the, 176; annoyance of the, to the sheep, 176.
 Laryngitis, symptoms and treatment of, 197.
 La Soloque, treatment of the sheep of, 185.
 Lasteyrie, M., his distinction of the different flocks of the Leonese migratory Merinos, 63.
 Laudanum, or tincture of opium, 219.
 Laurence, Mr. J., his account of a case of phrenitis, 181.
 Law, the, formerly in force, against exporting sheep into Ireland, 140; laws forbidding the exportation of wool from England, 146.
 Leicestershire, the long-woolled race of sheep radiated from, 115; woollen manufactures of, 154; breed of sheep, advantages derived by France from the establishment of the, in, 65; the improved breed of, pasturage required by, 126; the disposition of, to accumulate outside fat, 127; quality of the mutton of the, 126; the wool sacrificed to the carcase in the establishment of, 14; not a hardy race, 127; the influence of, visible in many other breeds, 127, 136; the old characters of, 123.
 Leonese Transhumantes, journeys of the, 54.
 Lewes, stock-market at, 96.
 Limestone, tracts of, deterioration in the wool of sheep fed on, 15.
 Lincolnshire, the sheep of, 113; wool of the, 130; old breed, value of the wool of, 81; inferiority of the carcases of, 80; crossing of the, with the Dishley Leicesters, 80; beneficial results 80; crosses between, and the new Leicesters, 130; the new, wool of the, 131; introduced into Northumberland, 128; farmer, exclusive attention paid to wool by the, 130.
 Lindfield, fair for sheep at, 96.
 Linen, use of, by the Egyptians, 3.
 Linseed oil, 216.
 Little, his account of the qualifications for a mountain shepherd, 117.
 Liver of the sheep, size of the, 192.
 Llama, wide application of the term, 155; locality of the, 155; natural food of the, 160; herd of the, sent by Godoy to the Empress Josephine, 159; adventures of, 159; the domestic, distinctions between, and the tame guanaco, 157; numbers of the, killed in Peru for the sake of their wool, 159; attempt to naturalize the, in England, failure of the, 160; causes of, 160; the wool of the, 159; importation of, into Europe, 159.
 Locked-jaw, or tetanus, 183.
 Longmynd, sheep of the, 104; cross between, and the Southdown, 104.
 Long-woolled sheep, what, 90; description of the, 123; antiquity of the, 134.
 Loughton sheep, the, 122.
 Lowland sheep, foresight of the approach of a snow-storm exhibited by the, 85.
 Low, Mr., his account of the manner of divesting sheep of their wool, in Orkney, 9.
 Luccock, Mr., his description of the wool of the Dishley sheep, after proper attention had been paid to its quality, 126; his remarks on the yolk, 13.
 Lungs, unsound, appearance of, in a slaughtered sheep, 199.
 Luxury, the demands of, 99.
 MAISON ALFORT, transportation of Bakewell's Leicesters to a farm at, 65.
 Majiggy, the breed of sheep in Soudan, 41.
 Maladie de Soloque, the, 186; symptoms of the, 186; treatment of, 186; appearances after death from the, 187.
 Mal d'Araignée, the, 210.
 Male sheep, various names of the, at different periods of his life, 74; in Scotland and the North of England, 74.
 Management of lambs, the, 213.
 Manchester cottons, act of parliament passed in 1552, concerning, 153.
 Mangel-wurzel, evils attending the cultivation of, 165; manner of giving, 166; dry food should be given with, 166.
 Manufactured goods, the, exported from England in 1354, 149; imported to England, 149.
 Maria Theresa, the Empress, her introduction of the Spanish Merino into Austria, 62.
 M'Arthur, Captain, breed of sheep introduced by him, excellence of the wool of the, 72.
 Maxillary bone, the inferior, 175; the superior, 175.
 M'Culloch, Mr., his account of the cloth manufacture at various epochs, 152; of the revival of the woollen trade, 150; of the wool trade during the last century, 2; of the measures taken by Edward III. for the improvement of the wool manufacture, 147; of the woollen manufactures of Scotland, 155; of the woollen manufactures of Wales, 108; his estimate of the annual produce of wool in the British empire, 137; his remarks on the laws made for putting down machinery, 149; his table of items regarding the manufacture of woollens in Great Britain, 3; his tabular view of the principal British breeds of sheep, in 1839, 91; his views concerning the naturalization of the llama in England, 160.
 Meadow fox-tail grass, 168.
 Meatus auditorius, 175.
 Medicine, manner of giving, to sheep, 202, 216.
 Medicines adopted in the treatment of sheep, 216.
 Mendip range of hills, the, 100; extent of, 100; sheep, the, 100; absorbed into a mingled race, 100.
 Mercurial ointment, 219.
 Merino, what, 155.
 Merino breed, the, produced in Spain, 33; general description of the, 53; pure, the Estantes, 53; the Transhumantes, 53; the idea of crossing other breeds with the, not entertained until a comparatively recent period, 60; the introduction of, into Denmark, 49; the introduction of into Tartary, 46; the wool of the, 54; continuous growth of, 69; remains of the ancient varieties of colour in the, 51; hue, the, indicates the original colours of the indigenous breeds of Spain, 52; lambs, necessity of destroying great numbers of, as soon as yeaned, 56; Society, establishment of a, in England, 70.
 Merionethshire, the sheep of, 106; practice of clipping twice in the year, 107.
 Mesopotamia, supplies of sheep imported to Syria from, 38.
 Mesta system, the, what, 54; account of, 55; origin of, attributed by Padre Sarmiento to the desolation caused by the plague in Spain, 57; established by ancient usage, 60; the real motive of overlooked by the Spanish shepherds, 60; how far conducive to the value of the Merino wool, 57.
 Metropolis, alterations effected in the supply of sheep to the, by the railroad and the steam-vessel, 143.
 Middlesex, the sheep of, 115.
 Middle-woolled sheep, qualities of the, 91.

- Migration of the Spanish Transhumantes, system of, 54; plan of, 54.
- Miry, not flooded, land, injurious to sheep, 195.
- Molina de Aragon, obstacles to agriculture presented by the, 58.
- Monge, M., his theory concerning the felting of wool, 10.
- Monmouthshire, old breed of sheep in, 103; present breed of sheep in, 103.
- Montagu, Lady Mary Wortley, her account of the amusements of the peasantry of European Turkey, 4.
- Montana de Aragon, obstacles to agriculture presented by the, 58.
- Moutbar, establishment of sheep on a farm near, 64.
- Montgomeryshire, the hill sheep of, 106; the fleece of, 106.
- Moorcroft, Mr., his opinion of the flock of shawl goats procured by M. Jaubert, 163.
- Moore, Mr., of Winthorpe, ewe possessed by him, 76.
- Moorish Spain, perfection in the manufacture of woollen fabrics attained by, 52.
- Moorlands, yearning time in the, 113; the sheep of the, independence of, 84.
- Morfe Common sheep, description of the, 103; attempt to cross them with the Merinos, 103.
- Morocco, breed of sheep in, 45.
- Moss and heath on the hills, practice of burning the, in the Scotch mountains, 119.
- Mouflon, the (*Ovis Musimon*), 20; character of, 21; description of, 21; hair of, 20; the Armenian, (*Ovis Gmelinii*), 22; description of, 22; of Cyprus, (*Ovis Ohpion*), 22; of the central parts of Persia, 22; of the Kachun region of Nepal (*Ovis Nâhoor*), 23; description of, 23; of Little Thibet (*Ovis Vignei*), 23; description of the, 23; of Sardinia and Corsica, according to some writers the parent stock of our domestic sheep, 19.
- Mountain sheep of Great Britain, boldness of the, 84; defensive attitude of the, 85; habit of the, of never descending into the valley at night, 85; farmer, the, precariousness of his profits, 116; feeders, their treatment of sheep, 118.
- Mousselin-de-laine, what, 155.
- Muzzle of the sheep, description of the, 74.
- Mysore-country, sheep of the, 40.
- NAMES given to individual sheep in ancient times, 4.
- Napier, the Hon. W. J., his advocacy of *stells* for mountain sheep, 88; his plan for smearing sheep, 89.
- Nasal bones, the, 175; cavity, lining membrane of the, 176.
- Navarre, la Basse, breed of sheep in, 66.
- Negretti breed of sheep, the what, 63; Merinos, sale of the, belonging to George III., 70.
- Nervous system, the, 173.
- Neurotomy, might be performed with advantage on the sheep, 211.
- Newgate and Leadenhall markets, supplies to, in July 1847, 144; prices sold at, 144.
- New South Wales, causes of loss against which the sheep-keeper of, has to contend, 73; damage done by the droughts of, 72; diseases of the sheep of, 73; management of the sheep of, 72.
- New wheat, poisonous, 203.
- Nigritia, see Soudan.
- Nitrate of potass, 217; of silver, a good caustic, 219.
- Norfolk farmers, partiality of, to turnips as food for sheep, 115; sheep, improvement in the, 115; comparison between, and the Southdown, 114; system of feeding the, 115; peculiar breed of heath sheep of, 113; superseded by the Southdowns, 114; recent increase in the long-woolled sheep of, 115; the manufactures of, 130; the woollen manufactures of, 153.
- North Downs, sheep of the, 96; Riding, breed of sheep of the, 112.
- Northumberland and Durham, long-woolled breed of sheep of, 127; the breeds of sheep of, 110; black-faced sheep of, 77; the mountain sheep of, 110; the turnip husbandry of, 110.
- North Wales, the hill sheep of, 106; number of sheep in, 108.
- Norway, wool imported to Great Britain from, 49; sheep of, 49.
- Norwich, colonization of, by the Flemings, 130, 153; establishment of a cloth manufactory at, by Edward III., and Philippa of Hainault, 147.
- Nottinghamshire, former breeds of short-woolled sheep of, 113.
- Notts, or Natts, breed of sheep called, description of the, 100.
- OAT-GRASS, yellow, 169.
- Occipital-bone, the, 175.
- Ochre, custom of rubbing the loins of the Spanish Transhumantes with, 55.
- Odessa, quality of the wool exported from, 46.
- Œstrus Ovis, the, 176.
- Oil-cake, a useful article of food for sheep, 165.
- Oil, or essence of peppermint, 218.
- Ointment recommended for the scab by Mr. Hogg, 209.
- Ointments and lotions, 219; used for garget, 210.
- Opium, a valuable sedative, 217.
- Orbits, the bony, of the eye, 175.
- Orkney Islands, sheep of the, 119.
- Orleans cloth, what made of, 155.
- Os cordis, the, 173.
- Ottara, Russian flocks of sheep, movements of the, 47; enemies of the, 47.
- Otter-sheep, the, 73.
- Oxfordshire, the sheep of, 135; new, 135.
- Ovejas marinas, similarity of the, to the old dun-faced sheep, 112.
- Ovid, his account of a plague which depopulated Ægina, 210, 211.
- Ovis, the genus, uncertainty enveloping the wild species of, 26; propensity for salt exhibited by, 28; distinctive characters of, 19; Ornata, the, 20; *Tragelaphus*, description of the, 19.
- Owen, Professor, his account of various fossil remains of the goat, 30.
- PACHA, Ibrahim, his attempt to increase the number of sheep produced in Syria, 38.
- Paco-llama, the, 158; specimen of, in the Zoological Gardens, 158.
- Parietal bones, the, 175.
- Paris, supplies of sheep to, 67.
- Parkinson, Mr., his description of the Irish mode of sheep washing and shearing, 141; proof given by, of the contagion of the foot-rot, 205.
- Parliament called in 1337 for the purpose of settling the wool trade, 148.
- Parry, Dr., excellence of his breed of Anglo-merino sheep, 69; his experiments in crossing the Spanish Merinos with English sheep, 68; his management of sheep, 68; his objection to the custom of washing sheep before shearing, 69.
- Parson, his description of the march of a horde of Arabs, 7.
- Parturition, practice of removing the ewes to a richer pasture before the time of, 211; preparations for, 211; proper situation for, 211; proper treatment in, 212, 213.
- Paget, Mr., list of the prices realized by a stock of Dishley ewes sold by him, 126.
- Palate of the sheep, description of the, 74.
- Palsy, or paralysis, causes of, 184; treatment of, 185; little hope of cure in, 185.
- Pamir sheep (*Ovis Poli*), Mr. Blyth's account of the, 25; description of the, 25.

- Pasture-land, importance of attention to the nature of the grass produce of, 167; of not overstocking, 167.
- Paular breed of sheep, the, what, 63.
- Peak of Derbyshire, black-faced sheep of the, 113.
- Pecunia, money, derived from pecus, a flock, 16.
- Peloponnesus, the, purple and scarlet cloths dyed there, 44.
- Pelt of the mouffon, character of the, 21.
- Penistone breed of sheep, the, 113; crossed with the Leicesters, the Cheviots, and the Ryelands, 113.
- Penny Magazine*, extract from the, 86.
- Perpignan, establishment of a farm at, for the rearing of Merino sheep, 64.
- Persian sheep, the, description of, 37; capable of great improvement, 37; the fat-tailed, 40; wool of, 40.
- Perspiratory vessels, the sluggishness of, in the sheep, compared with those of the man and the horse, 174.
- Pestilential diseases, antiquity of, 210.
- Petworth, fair for sheep at, 96.
- Philip and Mary, statutes of, for putting down machinery, 149.
- Phrenitis, treatment in, 181.
- Pickloch Merino, description of the, 56.
- Pipe, the shepherd's, still used in many parts of the Alps, and in some provinces of France, 5.
- Plague, the, of 1348-50, ravages of the, 57.
- Plaiding, the manufacture of, 154.
- Plaisters, nature of, 219; use of, 219; a good, in cases of the fly, 219.
- Planaria, the, 194.
- Plants, variety of, eaten by the sheep, compared with the horse and the ox, 202.
- Plint, Mr., his reasoning against the cultivation of the Anglo-merino, 71.
- Pneumonia, appearance of, as an epidemic, 197; symptoms of, 196; causes of, 196; treatment of, 197; appearances presented on examination after death from, 196.
- Poisons, 202.
- Polybius, his account of the use of the shepherd's horn in ancient times, 5.
- Pompadour, establishment of a farm at, for the rearing of Merino sheep, 64.
- Poplin, what, 155.
- Porloch, the breed of sheep of, 100.
- Potash in lime-water, solution of, 218.
- Potatoes, advantages of steaming for sheep, 166; manner of giving, 166.
- Poultees, the best, 219.
- Price, Mr., his account of the Romney Marsh sheep, 131; of the ravages of inflammatory fever among the sheep of Romney Marsh, 186.
- Provence, proceedings of the migratory sheep of, 66; the shepherds of, 66; the sheep of, 66.
- Prussia, improvement of the sheep of, by crossing with the Silesian flock, 61; introduction of the Spanish Merino sheep into, 61; of the Saxo-merino sheep, 61; present sheep possessions of, 69.
- Pulmonary artery, the, of the sheep, 173.
- Pürk sheep, the, of Ladakh, merit of, 34.
- Pyrenees, high, breed of sheep in the, 66; lower, breed of sheep in the, 66.
- RABIES, or madness, 182; symptoms of, 182; danger in handling a sheep affected by, 182; appearances presented upon dissection of a rabid sheep, 182; no creditable farmer would sell a sheep affected by, 183.
- Rambouillet, experiments tried at the farm at, 69.
- Ram, proper form of the, 76; selection of, for breeding, 79; strength of the, 85.
- Rape, considered as an article of food for sheep, 94.
- Read, Mr., his account of the cause and progress of the foot-rot, 206; do., remedial measures to be taken in, 207.
- Red-water, see Water-braxy.
- Refina wool, what, 56.
- Rheumatism, symptoms and treatment of, 203.
- Richard Cœur de Lion, the ransom of, to the Emperor of Germany, paid in wool, 146.
- Riley, Mr., his efforts to introduce the Thibet goat into Australia, 163.
- Rocky Mountain sheep, description of the, 27; the attention of naturalists not drawn to until 1803, 28; Father Piccolo's account of the, 27; specimen of, in the British Museum, 27; resemblance between and the Siberian Argali, 27; distinction between and the Siberian Argali, 28; colour of, 28; habits of, 28.
- Romans, establishment of woollen manufactories at Winchester by them, 31.
- Romney Marsh, the character of, 131; breed of sheep of, 95; ancient race of the, 131; cross of the, with the Leicesters, 132; the improved established, 132; care required by, in the lambing season, 133; hardships to which they are exposed in winter, 132; qualities of the, 131.
- Rot, the sheep of marshy districts principally diseased with, 194; the result of neglected inflammation of the liver, 192; various opinions concerning the cause of, 194; symptoms of, 193; treatment of, 195; ravages of the, 193.
- Rough-stalked meadow grass, 168.
- Rousillon, the sheep of, 65.
- Rowing sheep, common in Italy in early times, 9; still practised in Italy in the time of Pliny, 9; manner of, 119, 120.
- Rowland, Messrs., of Kilkenny, introduction of Merinos into the flock of, 71.
- Russia, Southern, the wool exported from, 46; recent improvement in the wool of, 46.
- Russian goats, their use in storms and hurricanes, 47.
- Russian sheep, their exposure on the plains, 47.
- Ryeland sheep, the old breed of, 102; description of, 102; attempted crossings of, with the Southdowns and Merinos, 103; crossed by Mr. Follet with the Merinos, 68; or Herefordshire sheep, the present, 103; change in the fleece of the, 102.
- Rye-grass, 166-169.
- Saline pastures, characteristics of the sheep fed on, 36.
- Salt, utility of, 195; manner of giving to the Spanish Transhumantes, 55.
- Salving, or smearing, 220; importance of, 220; objects of, 220; various unguents for, 220.
- Saphena, or thigh vein, method of bleeding from the, 175.
- Saracens, extinction of the woollen manufacture in Spain after their expulsion, 52.
- Saxo-Merinos, neglect of, in the improvement of English breeds of sheep, 71.
- Saxony, introduction of the Spanish Merino into, 61; success of in, 2, 61; cloth, what made of, 155.
- Sayer, Mr. D., mixture given by him in cases of dysentery, 191.
- Scab, the, nature of, 207; cause of, 207; contagion of, 207; symptoms and progress of, 207; treatment of, 209; appearances after death from, 209.
- Scoti, the, early occupiers of Ireland, 137.
- Scotland, the sheep of, 116; black-faced sheep of the hilly districts of, 77; the breeding flocks maintained in the southern parts of, 118; the woollen manufactures of, 154.
- Scott, Sir Walter, his explanation of the term braxy mutton, 189.
- Scottish mountains, great improvements in, bearing on the comfort of sheep, 119; shepherd, life of the, 117; plan on which he is engaged, 117.
- Sedatives and febrifuge medicines, nature of, 217.
- Sedative injections, the composition of, 216; a good, in pneumonia, 197.
- Seizures of wool made in 1128 and 1129, 146.
- Serges, what, 155.
- Shà, the. See *Ovis Vignei*.

- Shaw, Dr., his account of the Sahara sheep, 42.
- Shawl goat, growth of the coat of the, 161; difficulty of transporting a flock of the, from Thibet to Europe, 162; flock of the, brought by M. Jaubert to Marseilles, and Toulon, 162; condition of the, on landing, 163; distribution of the, 163; improbability of the naturalization of, in England, 164; shearing of sheep, practised by the Greeks in the time of Hesiod, 9.
- Sheep, early domestication of the, 3; few fossil remains of, 30; natural history of, 16; the abundance of, in ancient times, 6; much modified by domestication, 17; great utility of, 1; uncertainty when introduced into England, 31; two breeds of, early established in England, 33; value of, in the time of Ethelred, 32; in 712, 32; of Greece and Italy, North Africa and Phœnicia, must anciently have been wool bearers of superior excellence, 43; the principal wealth of the Russian nobles, 47; the domestic (*Ovis Aries*), an artificial being, 33; the long tail of, 29; crania of the, 30; senses of the, 90; skeleton of the, 76; when domesticated, examples of the boldness of the, 173; blind, careful attention paid to by their companions, 83; disposition of, to form friendships, 83; method of procuring a uniform and uninterrupted supply of food for, 94; manner of grazing of the, 74; mode of attacking an enemy, 175; peculiar personal sympathy towards each other, exhibited by, 83; anecdote of this, 83; propensity of, to follow their leader, evil consequences of the, 89; anecdotes illustrative of this, 90; spirit of imitation shown by the, 89; management of, by the Saxons, 32; upon land under turnip cultivation, 164; association of, for breeding, 81; can be over fattened, 116; dog, the ancient use of, 6; of the Abruzzi, 6; the Spanish, 6; of Thibet, 6; farmer, objects of the, 77; gatherers, of Iceland, proceedings of the, 50; husbandry, decided improvements in, 122; louse, the, what, 209; tick, the, what, 209.
- Shelter, sheep instinctively fly to, in storms, 88.
- Shepherd, the occupation of a, held in great esteem by the ancients, 4.
- Shepherds of the Transhumantes, winter employments of the, 55; in remote districts, often possess considerable medical and surgical skill, 172; practical schools for advantages to be derived from the establishment of, 172.
- Shetland Isles, characters of the, 121; their fisheries the principal consideration of the inhabitants of the, 122; number of sheep of the, 121; the sheep of, probably of Danish extraction, 119; general characteristics of, 119; characteristics of a ram of the pure breed of, 119; the management of sheep in the, 120; rams, bad selection of, to return to the mountains after rowing, 120; cross of the breed of, with the Dutch sheep, 120; winter coat of the, 121; winter life of the, 121; remains of the pure, 119; wool, remarks on the fineness of the, 121; quality of the best, 121.
- Shoddy-mills, 152.
- Short blue meadow grass, 168.
- Short wool, circumstances which led to the depreciation of, 136; woolled sheep, what, 90; the old English, change in, 91; whether deterioration or alteration, 92.
- Shropshire, the old breed of sheep in, 103; cross between, and the Dorset, 103; rapid decrease of short wool in, 104.
- Sight of the sheep, 90.
- Silverdale breed of sheep, the, 109.
- Skin of the sheep, use of, 1; employment of, in the secretion of the yolk, 174.
- Skull, the, of the sheep, 175; the general form of, differs in different breeds, 175.
- Smell, acute sense of, in the sheep, 90.
- Smith, Lieutenant T., his account of the capture of a burriel, 23.
- Smith, Mr. Robert, his account of the new Oxford breed of sheep, 135; experiments, proving the advantages of artificial food for sheep, 165; his remarks on the results of his experiments concerning the best management of sheep, 171; proper form of the sheep, 77.
- Smithfield cattle-show, objects of the, 78; market, table of the live-stock imported into, in July, 1847, 143, 144; prices sold at, 143.
- Smooth-stalked meadow grass, 168.
- Snow-storms, damage done to mountain-sheep by, 86.
- Softness of staple, what, 15.
- Soil, importance of the adaptation of sheep to the nature of the, 216.
- Somersetshire, breeds of sheep in, 99; sheep, kept in many parts of Sussex, 95; horned breed of, the old, 100; the woollen manufactures of, 153.
- Somerville, Lord, his account of a selection of Spanish Transhumantes imported by him into England, 70; his efforts in the cause of the establishment of the Merino sheep in England, 69.
- Sorian Transhumantes, proceedings of the, 55.
- Soudan, breed of sheep in, 41.
- Soundness of staple, what, 15.
- South Ham Notts, the, 133; improvement effected in, by intermixture with the Leicesters, 133.
- Southdown sheep, description of the, 77; range of the, 92; former characteristics of the, 93; attempts to improve them by crosses with the Leicesters and Merinos, 93; great improvement in, effected by Mr. Ellman, 93; prevalence of crosses with the Kent, Dorsetshire, Norfolk, Suffolk, and Cambridgeshire, 95; crossed by Lord Somerville with Spanish Merinos, 70; can, with proper care, be reconciled to the most uncongenial climate, 118; kept in Dorsetshire, Somersetshire, Devonshire, and Cornwall, 97; good health of the, 95; what owing to, 95; brown colouring of the, 92; average dead weight of the, 95; recent improvement in the hogget-wool of, 95.
- Spain, plains of, question of the advantages of cultivating the, 57; sheep probably established in, before the predominance of the Roman power, 52.
- Spanish sheep, ancient breeds of, 51; preservation of, in the midst of civil convulsions, 52; all trace of the history of the, lost in 466, 52; the importance of the, re-established in the beginning of the eighteenth century, 52; celebrity of some breeds of, 51; mixed breeds of, 53; Merinos, defects of the, 54; selection of, imported into England in 1791, 68; prejudice against, in England, 68; advocates for, in England, 68; success of, in England, 68; shepherds, 56.
- Sphenoid bone, the, 176.
- Spirit of tar, 219.
- Spleen, description of the, 196.
- Spontaneous generation, the doctrine of, 209.
- Squamous portion of the temporal bone, 175.
- Staffordshire sheep, old breed of, 104.
- Staggers in the lamb, symptoms, and treatment of, 215.
- Staple, the, proper character of, 14.
- Steatopygus breed of sheep, the, 36; change in, produced by transportation into the interior districts of Russia, 36; the Tartarian, description of, 36.
- Stells, for mountain sheep, proper form for, 89; the introduction of, in the Scotch mountains, 119; saving of sheep in a farm provided with, compared with one without, 89.
- Stephen, flourishing condition of the wool manufacture in the reign of, 145.
- Stephenson, Mr., two cases of dry braxy treated by him, 188.
- Stimulants, 219.
- Strains, wounds, and bruises, 211.
- Strangles, or strangulation, symptoms of, 201; treatment of, 201.
- Strasbourg, Merinos presented to the Agricultural Society of, 62.
- Stuart, Sir James, his importation of Spanish Merinos into Ireland, 71.

- Stuff, what, 155.
 Sturdy, the, symptoms of, 179; appearances presented on opening the skull after, 179; singular case of, 179.
 Suborbital foramen, the, 175; sinuses, the, present in the sheep, 18.
 Suffolk, the sheep, 115; peculiar breed of heath sheep of, 113; superseded by the Southdowns, 114; the rearing of Southdown sheep in, 115.
 Sulphate of mercury, or Ethiop's mineral, 216; combination of, with nitre and sulphur, 217.
 Sulphur, 216.
 Superfine cloths, short wool of English growth inadmissible for, 92.
 Sussex, Western, breed of sheep of, 95.
 Supra-orbital foramina, 175.
 Surrey, the sheep of, 96; Dorset sheep reared in, 96.
 Sutton Coldfield sheep, see Cannock Heath sheep.
 Sweden, the native sheep of, 61; the Merino sheep of Spain first naturalised in, 60; management of sheep in, 61.
 Swedes, (turnips,) considered as an article of food for sheep, 94.
 Swedish government, establishment of a pastoral school by the, 61; Merinos, management of the, 61; sheep, improvement in the breed of, since 1764, 61; turnip, the, more nutritious than the common white, 166.
 Swelling of the joints, or leg evil, 203; treatment of, 203.
 Syria, ancient passages in the Bible relating to the sheep of, 35; consumption of mutton in, 38; price of mutton in, 38.
 Syrian sheep, management of the, 37; fat-tailed, description of the, 37; goat, the long-eared, 161.
 TABLE of the cattle and other produce exported from Ireland in 1825 and 1835, 141; of the woollen exports from the United Kingdom, during the years 1831 to 1837, 151.
 Tar, 219, 220; disadvantage of, for smearing sheep, 89.
 Tares, considered as an article of food for sheep, 94; manner of sowing, 166.
 Taste, the sense of, in the sheep, 90; diversity of, in various breeds, 169.
 Tartarate of antimony, 217.
 Taruga, the, description of, 156.
 Tedal, the, see *Ovis Tragelaphus*.
 Tedderley sheep, description of the, 104; cross between the, and the Leicesters, 104; between the, and the Southdowns, 104.
 Teeswater breed, description of the, 128; long-woolled, the, 128; the old, 112; gradual obliteration of, 129; cross of, with the Dishleys, 129; advantages of the cross between the, and the Dishley sheep, 129; fertility of the, 129; improvement in the wool of the, 129.
 Teeth of the sheep, proper manner of examining the, 75; enamel of the, 74; the incisor, 74; decline and fall of the, 78; appearance of, at birth, 75; at a month old, 75; at 15 months, 75; at 2 years, 75; between 2 and 3 years, 75; at 3 years, 75; at 4 years, 75; at 5 years, 75.
 Terceira wool, what, 56.
 Tessier, M., his directions concerning the prevention of *la maladie de Sologne*, 187.
 Tetanus, true spasmodic, may arise without any assignable cause, 183; prevention of, easy, 183; causes of, 183; symptoms of, 183; treatment of, 183; rarity of, in canine animals, 184; cases of, in the dog, 184.
 Thibet goat, the, 161; introduction of, into England, 163; cross between, and the Angola goat, 63; shawls made at Paisley from the wool of, 163.
 Thompson, Mr. H. S., his conclusion concerning mangel wurzel, 165; his remarks on the temperature of the animal body, 172.
 Thomson, his account of a snow-drift, 85.
 Thrush, or apthæ of the mouth, symptoms of, 200; epidemic, 201; connection between, and ulcerated foot-rot, 201; treatment of, 201; adopted in France in 1745, 201.
 Thyatira, the trade of dying purple extensively carried on at, 44.
 Timothy grass, common, or meadow cat's tail grass, 169.
 Tochenlin, M., his account of inflammation of the spleen, 196.
 Tongue, inflammation of the, and the parts adjacent, see Blain.
 Tonics, 217.
 Top-dressing, the practice of, in the Scotch mountains, 119.
 Towers, Mr., his attempt to acclimatize the Thibet goat in England, 163.
 Transhumantes, management of a flock of, 55; long journeys of, 54; journey of the flocks of, from the hills to the planes, 55; injury often done to vineyards and cultivated tracts of land by the flocks of, 58; fleece of the, 56; process of shearing the, 56; wintering of, 55; return of, to their mountain pastures, 56.
 Trepbine, use of the, 176.
 Trimmer, Mr., his account of the Rambouillet flock of sheep in 1827, 65.
 Trueness of staple, what, 15.
 Tschabawn, Russian keeper of sheep, habits of the, 47; proceedings of the, and his flock in fine weather, 48; his night arrangements, 48; an old Russian, his account of a snow-storm, 47.
 Tunis, caps manufactured at, 42.
 Tunisian caps, the process of manufacturing them, 42.
 Turbinate bone, the inferior, 176; the superior, 176.
 Turner, Sir Charles, his description of the routine of treatment to which the old breed of Ryeland sheep were habituated, 102.
 Turner, Sharon, his account of the Britons at the time of the arrival of the Saxons, 32.
 Turnip, the, considered as an article of food for sheep, 94; crop, the, liable to failure, 165; system, the, 164; husbandry, the introduction of, 94; advantages of, 94; Swedes, considered as food for sheep, 94.
 Turpentine, 219.
 Turnsick, the, see Sturdy.
 Twin-lambs, common, 81; some breeds of sheep more noted for the production of, then others, 81; one often repulsed by the mother, 81; management of one, when deserted by its mother, 81.
 Two-pounder, Mr. Bakewell's ram called, 125.
 Tyre, passage in the *Penny Cyclopædia* relative to the dyed wools of, 43, 44.
 ULCERATION of the mucous membrane of the intestinal canal, a common result of dysentery, 192.
 Unguent recommended by Mr. Hogg to be rubbed over sheep after shearing, 220.
 United States, sheep of the, 73; supplies of wool to the, 73; exports and imports of the, 73.
 VENTRICLES of the heart, difference between the two, 173; the right, danger of an accumulation of blood in the, 173; provisions for strengthening, 173.
 Verdigris, or acetate of copper, 219.
 Vernal grass, the sweet-scented, 168.
 Veterinary surgeon, should be had recourse to, without any needless delay, 172, 199, 216.
 Vicuna, the, 156, 158; description of the, 158; habits of the, 158.
 Vigers, Mr., his statement concerning the llama, 160.
 Virgil, his description of a housewife, 4; of the pastoral tribes of Libya, 8; his directions concerning the management of sheep, 8; his injunctions to the keepers of sheep, 6; his notice of the scab, 207.
 WALES, the hill and vale sheep of, 106; the introduction of turnip husbandry into, 106; neglect of sheep in, 107; the starving system prevalent in, 107; the woollen manufacture of, 154.

- Wallachian sheep, the, (*Ovis Aries*), 35; description of the, 35; specimen of the, presented to the Zoological Society, 35; the, superseded by the Merino, 49; sheepskins, utility of, 49; wool, 49; lambskins, value of, 49.
- Weald, the sheep of the, 96.
- Weaning of lambs, 214; management of, 214.
- Weaving, antiquity of the art of, 3.
- Wells, the ancient, used for watering sheep, 7.
- Welsh sheep, general character of the, 104; crossings of the, with Leicesters and Cotswolds, 106; with Southdowns and Cheviots, 106; mutton, 104; peasantry, change in the domestic economy of the, as respects the manufacture of wool, 108.
- West country cloth, the, 153.
- Westmoreland, the sheep of, 109; the black-faced sheep of, 77.
- Wethers, treatment of, by the Sussex breeders, 94.
- White, Mr., his account of the effect of bleeding in epidemic pneumonia, 197; of the adoption of a leverett by a cat, 82; his remarks on the Sussex sheep, 95.
- White-lead, 219.
- Wicklow, introduction of the Southdown sheep into, by the Farming Society of Ireland, 139.
- Wild sheep of the Himalayan regions, (*Ovis Ammonoides*), description of the, 26.
- Wiltshire sheep, the old breed of, 97; management of, 97; and Sussex sheep, difference in the, 97; crosses of Merino sheep with the old breed of, 97; ewes, crossings of, by Mr. Bartly with Merino rams, 68; merged into the Southdown sheep, 97; advantages derived from the introduction of Southdowns into, 97; the woollen manufactures of, 153.
- Winchester, establishment of a woollen manufactory at, 145; the manufactures of, in the reign of Stephen, 145; manufactory at, disputed question whether short or long wool was employed in the, 145; conjectured to have been supplied with wool of long staple, 31.
- Wiring, the operation of, 180.
- Woburn, experiment tried at, concerning rye-grass, 169.
- Wokey Hole, the cavern of, 100.
- Wold sheep, the, of Lincolnshire, 131.
- Wolf, the, common in Ireland long after their extirpation from England, 138.
- Wolves, their attacks on the sheep of Southern Russia, 47, 48.
- Woodland sheep, the, 109.
- Wool, the growth of, 13; mixed with the hair of most quadrupeds, 10; when coarse, and when fine, 14; variations in the fineness of, influenced by soil and climate, 14; by feeding, 14; utility of, 2; early and rapid improvement in, 10; deterioration in, caused by high feeding, 78; annual production of, in Great Britain, 2; quantity of, exported from England in 1837, 152; quantity of, imported into the United Kingdom in 1837, 152; quantity of, retained for home consumption, 152; quantity of, re-exported, 152; the black, of Spain, apt to break out in the legs and ears of the Merino race, 52; growers of Barbary, frauds practised by them, 43; spinning practised by Anglo-Saxon females of the highest rank, 32; combing, changed into short, 91; short account of the gradual decline of, and increase of long, 137; causes of the alteration in the character of, 136.
- Woollen cloths of Britain early celebrated, 31; flourishing condition of the manufacture during the time of the Romans, 31; probable effect on, produced by the withdrawal of the Romans from Britain, 32; manufactures, rising prosperity of, in the reign of Stephen, 146; various manufactures, 154.
- Woollen trade, decay of in the reign of Henry II., 147; decline of, in the reigns of John, Henry III., Edward I., and Edward II., 146; revival of, in the reign of Edward III., 147; stagnation of, from the time of Edward III. to the accession of George III., 149; estimate of, from 1700 to 1836, 150; prosperity of, in 1354, 148; estimate of the value of the, in 1834, 152; the, between England and Ireland, 140.
- Worcestershire, old breed of sheep in, 103; present breed of sheep in, 103; the dyers of, 146.
- Worsted, derivation of the name of, 130, 153.
- Wurtemberg, the Duke of, flock of Spanish sheep purchased by him in 1786, 62.
- YEW, foliage of the, poisonous, 202.
- Yolk, the, 174; nature and properties of, 13.
- Yorkshire, the sheep of, 112; short-horned cattle of, treatment of the, 78; rapid progress of the long-woolled breed of sheep in, 113; breed of sheep in the East Riding of, 113; woollen manufactures of the West Riding of, 152; halls established in, for the sale of cloth, 153; proportion of the woollen manufactures of, to those of the whole of England, 153.
- Youatt, Mr., his account of the covering of the mouflon, 21; of the recent change in the English fleece, 78; of French wool, 65; of the sheep supplied to Paris from various parts, 67; of the advantages of smearing, 89; of the excellencies of the Merino breed of sheep, 54; of his discovery concerning the felting properties of wool, 10, 11; of a case of strangles, 201; of the post mortem examination of a sheep killed by rot, 193; his arguments in favor of the antiquity of the British long-woolled sheep, 134; his explanation of the sudden decline of the Merino sheep in the public estimation, 71; his notice of various epidemic plagues among sheep, 211; his observations on the sheep of Devonshire, 101; on the want of action in the capillaries of the sheep, 174; on the production of acari, 208; his summing up of the differences between hair and wool, 12.
- ZAWAN, Tunisian caps, dyed at, 43.
- Zuno, the, of Angolo, Congo, &c., description of, 41; termed goitred sheep, 41.
- Zygomatic or malar bones, the, 175.

INDEX TO THE DOG.

- ACUPUNCTURE, used in neuralgic affections, 382; mode of performing, 382.
- Adam, Mr., on fungus hæmatodes, 377.
- Adeps, the basis of all ointments, 383.
- African wild dog, description of the, 234.
- Agasæi, British hunting dogs, description of, 225.
- Age, the indications of, 335.
- Albanian dog, description of the, 236.
- Alcohol, only used in tinctures, 383.
- Alicant dog, description of the, 289.
- Aloes, Barbadoes, the best purgative, 383.
- Alpine spaniel, description of the, 258.
- Alteratives, the most useful, 383.
- Alum, a powerful astringent, 383.
- Amaurosis, symptoms of, 323.
- American wild dogs, description of the, 234.
- Anæmia, description of, 339; causes of, 339; *post mortem* appearances, 339.
- Anasarca, nature of, 352.
- Andalusian dog, description of the, 289.
- Angina, nature of, 336.
- Antimony, the oxide of, a sudorific, 383; the black sesquisulphuret of, an alterative, 383.
- Anubis, an Egyptian deity with the head of a dog, 223.
- Anus, polypus in, 328; fistula in the, 361.
- Aquafortis a caustic, 382.
- Argus, the dog of Ulysses, 226.
- Arrian, on hunting, 224.
- Artois dog, description of the, 289.
- Ascarides, a species of worms, 359.
- Ascites, see Dropsy.
- Attention, an important faculty, 293.
- Auscultation, use of, 340.
- Australasian dog, description of the, 232.
- BARBARY dog, description of the, 289.
- Barbet, description of the, 252.
- Bark, Peruvian, a valuable tonic, 383.
- Barry, a celebrated Bernardine dog, anecdote of, 254.
- Bath, use of, in puerperal fits, 366.
- Beagle, description of the, 265.
- Bell, Professor, opinion on the origin of the dog, 222.
- Bernardine dog, description of the, 253.
- Billy, a celebrated terrier, 287.
- Bladder, inflammation of the, 357; rupture of the, 358.
- Blain, nature, causes, treatment, and *post mortem* appearances, 333.
- Blaine, Mr., opinion on kennel lameness, 273; on tetanus, 347; on dropsy, 352; on calculus, 357; on distemper, 372; on mange, 376.
- Bleeding, best place for, 361; directions for, 361; useful in epilepsy, 298; useful in distemper, 371.
- Blenheim spaniel, description of the, 249.
- Blisters, uses of, 383; composition, 383; mode of applying and guarding, 383.
- Bloodhound, description of the, 278.
- Brain, comparative bulk of, in different animals, 290; description of the, 290.
- Breaking-in of hounds, 270; cruelty disadvantageous, 294.
- Breeding of greyhounds, 242; should always be permitted, 225.
- British hunting dogs, Agasæi, description of, 225.
- Bronchocele, nature of, 337; causes and treatment of, 337.
- Buansu, or Nepal dog, description of, 229.
- Buffon, opinion as to the origin of the dog, 289.
- Bull-dog, description of the, 284; crossed with the greyhound, 240.
- Bull-terrier, description of the, 285.
- CÆCUM, description of the, 345.
- Calculus, nature, causes, and treatment of 356; in the intestines, causes of, 349; cases, 349.
- Calomel, a dangerous medicine, 384; should not be used in enteritis, 347.
- Cancer, symptoms of, 377; treatment of, 377.
- Canis, genus, 227; familiaris, sub-genus, 227.
- Canker in the ear, causes, symptoms, and treatment of, 323; cases of, 324.
- Canute, law concerning greyhounds by, 238.
- Cardia, description of the, 344.
- Castor oil, a valuable purgative, 384.
- Castration, proper time for, 363; mode of performing, 363; not recommended, 363.
- Cataract in the eye, 322.
- Catarrh, a cause of distemper, 367; naval, 369.
- Catechu, an astringent, 384.
- Caustic, lunar, the best, 383.
- Cayotte, description of the, 234.
- Chabert, anecdote of the dog of, 258.
- Chalk, an astringent, 384.
- Charles I., anecdote of the dog of, 239.
- Charles II.'s spaniel, description of, 249.
- Chest, anatomy and diseases of the, 338; proper form of it in the greyhound, 241; in the fox-hound, 267.
- Chest-founder, nature, causes, and treatment of, 301.
- Chloride of lime, uses of, 384.
- Chorea, nature of, 299; causes, 299; treatment, 299; cases, 300; in distemper, 373, 374.
- Chryseus scylex, or dhole, description of the, 230.
- Claret, a celebrated greyhound, 241.
- Classification, zoological, 227.
- Climate, effect of, 227.
- Clysters, uses of, 384.
- Coach-dog, description of the, 236.
- Cocker, description of the, 248.
- Colic, causes, symptoms, and treatment of, 349.
- Colon, the, 346; rupture of the, 348.
- Colour of the greyhound, 242; of the pointer, 281.
- Constipation, causes and treatment of, 350.
- Copper, preparations of, and their uses, 384.
- Coryza, the early stage of distemper, 370.
- Costiveness, causes and treatment of, 350; means of preventing, 351.
- Cough, spasmodic, nature and treatment of, 341.
- Coursing, Ovid's description of, 237; anecdotes of, 240, 241; laws of, 385; general rules for the guidance of judges, 386; local rules, 386.
- Creosote, a dangerous medicine, 384; useful in canker, 325.
- Creta, an astringent, 384.
- Cropping of the ears, 293; deafness frequently caused by, 393; disapproved of, 326; proper method of, 327.
- Cross-breeding, effect of, 227.
- Cuba, mastiff of, 286.
- Cur, description of the, 264.
- Cyprus, greyhounds of, described, 243.
- Cygnosurus cristatus, an useful emetic, 344.

Czarina, a celebrated greyhound, 240.

DAKHUN wild dog, description of the, 230.

Dalmatian dog, description of the, 236.

Danish sacrifices of dogs, description of, 235; dog, description of the, 236.

Deaf, description of the, 234.

Deafness frequently caused by cropping, 293.

Deer-hound, description of the, 244.

Delafond, Professor, his table of the diagnostic symptoms of pleurisy and pneumonia, 343.

Dentition, formula of, 334.

Dew-claws, 294; their removal unnecessary, 294.

Dhole, description of the, 230.

Diaphragm, description of the, 338.

Diarrhœa, cause, nature, and treatment of, 350; habitual, 350.

Dick, Professor, on rabies, 314; on the use of the ergot of rye, 365.

Digestion, the process of, 344, 345.

Digitalis, the uses of, 384.

Digitigrade, an order of animals, 227.

Dingo, description of the, 232.

Distemper, origin of the name, 367; is a new disease, 367; causes of, 367; is contagious, 367; is epidemic, 367; effects on different breeds, 368; symptoms, 368; nature of, 369; duration, 370; *post-mortem* appearances, 370; treatment, 371; a cause of epilepsy, 298; sometimes terminates in palsy, 374.

Dog, early history of the, 221; used as a beast of draught, 221; for food, 222, 235; uses of the skin of the, 222; origin of, 222, 227; mention of in the Old and New Testaments, 223; anecdotes of the sagacity and fidelity of, 225; changes produced in, by breeding and climate, 227; zoological description of, 227; natural divisions of 228; sacrificed by the Greeks and Romans, 235; by the Danes and Swedes, 235; African, wild, 234; Albanian, 236; Alicant, 289; Alpine spaniel, 253; American, wild, 234; Andalusian, 289; Artois, 289; Australasian, 232; Barbary, 289; barbet, 252; beagle, 265; black and tan spaniel, 249; Blenheim spaniel, 249; bloodhound, 278; British, 225; bull, 284; bull-terrier, 285; coach, 236; cocker, 248; cur, 264; Dakhun, 230; Dalmatian, 236; Danish, 236; drover's, 263; Egyptian, 289; Esquimaux, 256; fox-hound, 267; French matin, 237; French pointer, 282; gasehound, 245; Grecian, 224; Grecian greyhound, 246; greyhound, 237; hare Indian, 236; harrier, 266; Highland greyhound, 244; Hyrcanian, 225; Iceland, 287; Irish greyhound, 245; Italian greyhound, 247; Italian wolf, 263; Javanese, 232; King Charles' spaniel, 249; Lapland, 258; lion, 252; Locrian, 225; lurcher, 264; Mahratta 230; Maltese, 252; mastiff, 285; Molossian, 225; Nepal, 229; Newfoundland, 254; New Zealand, 233; otter, 284; Pannonian, 225; pariah, 231; Persian greyhound, 246; pointer, 281; Polugar, 230; poodle, 251; Portuguese pointer, 282; Russian greyhound, 246; Russian pointer, 282; Scotch greyhound, 244; Scotch terrier, 288; setter, 279; sheep, 258; shock, 289; southern hound, 278; spaniel, 247; spanish pointer, 281; springer, 249; stag-hound, 277; Sumatran wild, 232; terrier, 287; Thibet, 231; Turkish, 252; Turkish greyhound, 246; Turnspit, 284; water spaniel, 249; wild, 229; wolf, 245.

Dog-carts, prohibition of, disapproved, 221; should be licensed, 293.

Dog-pits, 295.

Dog-stealing, 295.

Dog's-tail grass, the use of, 344.

Dogs, Isle of, origin of the name, 239.

Drospy, 351; causes of, 351; cases of, 351; treatment of, 352.

Drover's dog, description of the, 263.

Duodenum, the, 344.

Dupuy, M., on diseases of the spinal marrow, 302.

Dysentery; nature of, 350; treatment of, 350.

EAR, diseases of the, 323; vegetating excrescences in the, 325; eruptions in the, 326; cropping of the, 326; polypi in the, nature and treatment of, 327; pain of, an early symptom in rabies, 307.

Egyptian worship of the dog, 223; dog, description of the, 289.

Elfric, king of Mercia, possessed greyhounds, 238.

Emetic tartar, uses of, 383.

Emetics, useful in distemper, 371.

Enteritis, causes, symptoms, and treatment of, 347.

Epiglottis, description of the, 336.

Epilepsy, causes of, 297; treatment of, 298; cases, 298; puerperal, 366; in distemper, 369, 372.

Epsom Salts, a purgative, 384.

Ergot of Rye, use of, in parturition, 364, 365.

Esquimaux dog, description of the, 256.

Ethiopia, a dog elected king of, 223.

Ethmoid bones, description of the, 328.

Extremities, bones of the, 296.

Eye, distinctive form of the, 222, 227; diseases of the, 320; construction of the, 320; cases of disease of the, 321; congenital blindness, 322; ophthalmia, 322; cataract, 322; amaurosis, 323; appearance of in rabies, 310; appearance of in distemper, 368.

FEET, sore, 378.

Femur, fracture of the, 379.

Fighting-pits, 295.

Fistula in the anus, causes and treatment of, 361.

Fits, symptoms of, 297; treatment of, 298; distemper, 369, 372; puerperal, 366.

Fitzhardinge, Lord, his management of hounds, 273.

Flogging hounds, disapproval of, 270.

Food, the dog used for, 222, 235; of the greyhound, 243; of the foxhound, 274; insufficient, a cause of distemper, 367.

Fore-arm, fracture of the, 379.

Foxhound, description of the, 267; size and proper conformation of, 268; pupping, 269; treatment of whelps, 269; breaking-in, 270; management in the field, 271; general management and food of, 274; Lord Fitzhardinge's management, 273.

Fractures, most frequent in young dogs, 379; of the humerus, 379; of the thigh, 379; of the femur, 379; of the radius, 379; of the fore-arm, 379; of the shoulder, 380; of the pelvis, 381; of the skull, 381.

French pointer, description of the, 282.

Fungus hæmatodes, a case of, 377; post mortem appearances, 378.

GASEHOUND, description of the, 245.

Gêlert, the dog of Llewellyn, poem on the death of, 239.

Gentian, a stomachic and tonic, 384.

Ghoo-khan, or wild ass, hunted by Persian greyhounds, 247.

Giddiness, nature and treatment of, 297.

Ginger, a cordial and tonic, 384.

Glass, powdered, the best vermifuge, 359, 371.

Goitre, nature of, 337; cause and treatment of, 337.

Goodwood kennel, description of, 275; plan of, 276.

Grecian dogs, description of, 224; sacrifices of dogs, 235; greyhound, description of the, 246.

Greyhound, description of the, 237; puppies, cut of, 224; origin of, 238; known in England in the Anglo-Saxon period, 238; old verses describing the, 240; cross with the bull-dog, 240; proper conformation of, 241; colour of, 242; breeding, 242; rules for age, 243; food, 243; training, 243; laws for coursing with, 383; English, 238; Grecian, 246; Highland, 244; Irish, 245; Italian, 247; Persian, 246; Russian, 246; Scotch, 244; Turkish, 246.

- Grogner, Professor, description of the French sheep-dog, 259.
 Gullet, description of the, 344.
 HARE Indian dog, description of the, 236.
 Harrier, description of the, 266.
 Head, bones of the, 296; form of in the foxhound, 267.
 Heart, description of the, 339; action of the, 339; rupture of the, 340.
 Hecate, dogs sacrificed to, 235.
 Hepatitis, causes, symptoms, and treatment of, 354.
 Hertwich, Professor, on rabies, 318.
 Highland greyhound, description of the, 244.
 Hindoos regard the dog unclean, 223.
 Hogg, James, anecdotes of his dog, 261.
 Hog's lard, the basis of all ointments, 383.
 Hound, the various kinds of, 265; blood, 278; fox, 267; otter, 284; southern, 278; stag, 277.
 Humerus, fracture of the, 379.
 Hunting with dogs first mentioned by Oppian, 224.
 Hunting kennels, 272.
 Huntsman, the requisites of a, 271.
 Hydatids in the kidneys, 356.
 Hydrocyanic acid useful in cases of irritation of the skin, 382.
 Hydrophobia, see Rabies.
 Hyrcanian dog, description of the, 225.
 ICELAND dog, description of the, 287.
 Ileum, description of the, 345.
 Incontinence of urine, 358.
 India, degeneration of dogs in, 230.
 Inflammation of the lungs, 340; of the stomach, 344; of the intestines, 347; of the peritoneal membrane, 348; of the liver, 358; of the kidney, 356; of the bladder, 357; of the fat, 378.
 Intelligence of the dog, 290; anecdotes illustrative of the, 291.
 Intestines, description of the, 345; inflammation of the, 347.
 Intussusception, nature and causes of, 350; treatment, 350.
 Iodine, a valuable medicine in goitre, 337; in dropsy, 353.
 Irish greyhound, description of the, 245; wolfdog, 245; setter, 279.
 Italian greyhound, description of the, 247; wolfdog, 263.
 JAMES'S powder, a sudorific, 383.
 Jaundice, causes, symptoms, and treatment of, 354.
 Javanese dog, description of the, 232.
 Jejunum, description of the, 345.
 Jenner, Dr., on distemper, 373.
 Jews regard the dog with abhorrence, 223.
 John, King, kept many dogs, 238; received greyhounds in lieu of fines, 239.
 KAMTCHATKA, uses of the dog as a beast of draught in, 221.
 Karázáhé, or New Zealand dog, description of the, 233.
 Kennel, description of, 272; Goodwood, 275; plan of Goodwood, 276; for watchdog, construction of, 294; hare, use of, 294; lameness, nature of, 272; causes of, 272; means of prevention, 273.
 Kidney, inflammation of the, 356; hydatids in the, 356.
 King Charles's spaniel, description of, 249.
 LACHRYMAL duct, description of the, 329.
 Lapland dog, description of the, 258.
 Lard, the basis of all ointments, 383.
 Larynx, description of the, 336; inflammation of the, 336.
 Laws of coursing, 385.
 Leblanc, M., on jaundice, 354.
 Léonard, M., his exhibition of dogs, 291.
 Lime, chloride of, the uses of, 384.
 Lion dog, description of the, 252.
 Lips, functions of the, 334; swellings of the, 334.
 Liver, description of the, 353; functions of the, 353; inflammation of the, 353.
 Llewellyn, poem on the dog of, 239.
 Locrian dog, description of the, 225.
 Lunar caustic, the best, 383; recommended for bites of rabid dogs, 316.
 Lungs, inflammation of the, 340; congestion of the, 341.
 Lurcher, description of the, 264.
 MADNESS, canine, see Rabies.
 Magnesia, sulphate of, a purgative, 384.
 Mahratta dog, description of the, 230.
 Majendie, his experiments on the olfactory nerves, 331.
 Major, a celebrated greyhound, 241.
 Maltese dog, a description of the, 252.
 Mammalia, a class of animals, 227.
 Management of the pack, 274.
 Mange, nature of 375; is hereditary, 376; the scabby, 376; treatment of, 376; causes of, 376; frequently causes goitre, 337.
 Mastiff, description of the, 283; used in Cuba to hunt the Indians, 286.
 Mâtui, description of the, 237.
 Maxillary bones, description of the, 329.
 Meatus, description of the, 329.
 Medicines, a list of the most useful, 382; mode of administering, 382.
 Medullary substance of the brain, 290.
 Memory of the dog, 293.
 Mercury, preparations of, 384; uses of, 384.
 Milk, accumulation of, in the teats, 363; secretion of, connected with cancer, 377.
 Mohammedan abhorrence of dogs, 223.
 Molossian dog, description of the, 225.
 Moral qualities of the dog, 282.
 Nasal bones, description of the, 329; catarrh, nature of, 369; cavity, polypus in the, 328.
 Neck, should be long in the greyhound, 241.
 Nepál dog, description of the, 229.
 Nerves, description of the, 290.
 Nervous system, diseases of the, 297.
 Newfoundland dog, description of the, 254.
 New Holland dog, description of the, 232.
 New Zealand dog, description of the, 233.
 Nimrod, opinion of, on kennel lameness, 273.
 Nitrate of potash, a useful diuretic, 384.
 Nitrate of silver, a caustic, 383; recommended for the bites of rabid dogs, 316; useful in chorea, 299; in canker, 324.
 Nitric acid, a caustic, 382.
 Norfolk spaniel, description of the, 249.
 Nose, anatomy of the, 328; diseases of the, 330; discharge from the, in distemper, 369.
 Olfactory nerves, size of, in different animals, 290; development of the, 328; description of the, 330.
 Ophthalmia, symptoms of, 320; causes of, 322; treatment of, 322.
 Oppian, the first who mentions hunting with dogs, 224; description of British dogs, 225.
 Orbit of the eye, form of the, 321.
 Orford, Lord, first crossed greyhounds with the bull-dog, 240; death of, 240.
 Otter-hound, description of the, 284.
 Ovaries, removal of the, 363.
 Ovid, description of coursing by, 237.
 Ozæna, nature and treatment of, 330.
 Palate, veil of, 329; inflammation of the, 329.

- Palsy, causes of, 301; treatment of, 302; a consequence of chorea, 299; a consequence of distemper, 374.
- Palm oil, an emollient, 384.
- Pancreas, functions of the, 356.
- Pannonian dog, description of the, 225.
- Pariah, description of the, 231.
- Parry, Captain, description of the Esquimaux dogs, 256.
- Parturition, time of, 363; management during, 364; use of the ergot of rye, 364, 365; inversion of the uterus after, 366.
- Pelvis, fracture of, 381.
- Percivall, Mr. on fractures, 380.
- Pericardium, description of the, 338; case of a wound in the, 339.
- Peritonitis, symptoms and treatment of, 348.
- Persian greyhound, description of the, 249.
- Peruvian bark, a valuable tonic, 383.
- Phlegmonous tumour, nature and treatment of, 338.
- Pleurisy, nature of, 340; diagnostic symptoms of, 343.
- Pneumonia, nature and treatment of, 340; diagnostic symptoms of, 343; distemper, 371; a consequence of small-pox, 375.
- Pointer, compared with the setter, 280; early training of, 282; breaking in, 282; English, 281; French, 282; Portuguese, 282; Russian, 282; Spanish, 281.
- Pollux, the introduction of hunting with dogs attributed to, 224.
- Polugar dog, description of the, 230.
- Polypus in the ear, 327; in the nasal and anal cavities, 328; in the vagina, 328.
- Pomeranian wolfdog, description of the, 263.
- Poodle, description of the, 251.
- Portuguese pointer, description of the, 282.
- Potash, the nitrate of, a useful diuretic, 384.
- Prussic acid, useful in cases of irritation of the skin, 382.
- Puerperal fits, causes, nature, and treatment of, 366.
- Pulse of various animals, 339.
- Pupping, see Parturition.
- Purging in distemper, 369; should be avoided, 372.
- Pythagoras, his high opinion of the virtues of the dog, 223.
- RABIES**, 303; cases, 304; early symptoms, 305; progress, 308; post-mortem appearances, 312; causes, 313; period of incubation, 313; duration, 314; nature of the virus, 314; nature of the disease, 314; treatment of persons bitten, 315; in the horse, 316; in the rabbit, 317; in the guinea pig, 317; in the cat, 317; in the fowl, 317; in the badger, 318; in the wolf, 318; trials concerning the death of persons by, 319.
- Radius, fracture of the, 379.
- Radcliffe, D., on scent, 332.
- Rectum, the, 346.
- Retriever, Newfoundland dog used as, 256.
- Rheumatism, nature, causes, and treatment of, 301.
- Richard II., anecdote of the dog of, 239.
- Richmond, the third Duke of, built Goodwood kennel, 275.
- Roman sacrifices of dogs, description of, 235.
- Rounding the ear in canker, disapproved, 324.
- Rottenness of the lungs, 341.
- Rupture of the heart, case of, 340; post-mortem appearances, 340; of the colon, 348; of the bladder, 358; Russian greyhound, description of the, 246; pointer, description of the, 282.
- SALIVA**, state of, in rabies, 308.
- Salts, a purgative, 384.
- Scabby mange, nature and treatment of, 376.
- Scent, the term, 331; description of, 331; influence of the atmosphere upon, 331.
- Scotch greyhound, description of the, 244; terrier, description of the, 288.
- Scott, Sir Walter, anecdote of the dog of, 285; verses on the dogs of, 289.
- Seton, useful in epilepsy, 298.
- Setter, description of the, 279; early training of, 282; compared with the pointer, 280.
- Sheep dog, description of the, 258; anecdotes of the, 261, 262; supposed by Buffon to be the original type, 289; French, description of the, 259.
- Shock dog, description of the, 289.
- Shoulder, fracture of the, 380; proper form of the, in the greyhound, 241.
- Siberian dog, description of the, 257.
- Simonds, Professor, on fractures, 381.
- Simpson, Mr., on the use of the ergot of rye, 365.
- Skeleton, description of the, 296.
- Skin, uses of the, 222.
- Skull, form of, adopted as the arrangement of the varieties of the dog, 227; fracture of the, 381.
- Small-pox, 374; symptoms, causes, and treatment of, 375.
- Smell, the sense of, 290, 331.
- Snowball, a celebrated greyhound, 241.
- Sore feet, causes of, 378; treatment, 378.
- Southern hound, description of the, 278.
- Spaniel, origin of the, 247; description of the, 247; Blenheim, 249; King Charles's, 249; Norfolk, 249; water, 249.
- Spanish pointer, description of the, 281.
- Spasmodic cough, nature and treatment of, 341.
- Spaying, mode of performing, 363.
- Spleen, functions of the, 355; diseases of the, 354.
- Springer, description of the, 249.
- Staghound, description of the, 277; anecdotes of the, 277.
- Staling, profuse, 358.
- Starch-bandage, useful in fractures, 381.
- Stealing of dogs, 295.
- Stomach, anatomy and diseases of the, 344; case of the retention of a sharp instrument in the, 345.
- Strychnia, a valuable medicine in palsy, 303.
- Sulphur, the basis of applications for mange, 384; a good alterative, 384.
- Sumatra, description of the wild dog of, 232.
- Surfeit, an eruption resembling mange, 376.
- Swedish sacrifices of dogs, description of, 235.
- Sympathetic nerves, 290.
- TENIA**, a species of worm, 359.
- Tailing, 293.
- Tape-worm, 359.
- Tapping in cases of dropsy, 352.
- Tartar emetic, a useful medicine, 383.
- Teeth, distinctive arrangement of the, 227; description of the, 334; cuts showing the various stages of growth and decay, 334, 335; supernumerary, 335; diseases of the, 335; very early lost by the Turkish dog, 253.
- Teres, a species of worm, 359.
- Terrier, description of the, 287; training of the, 287; anecdotes of the, 287; Scotch, description of the, 288.
- Tetanus, causes of, 346; symptoms and treatment of, 346.
- Thibet dog, description of the, 231; cut of the, 228.
- Thigh, fracture of the, 379.
- Thyroid cartilage, description of the, 336.
- Toes, sore, 378; number of, 378.
- Tongue, description of the, 332; mode of drinking, 332; worming, 333; blain, 333.
- Torsion, mode of performing, 361; forceps, 361.
- Training of the greyhound, 243; of the fox-hound, 270; of the pointer or setter, 282.
- Trimmer, Mr., description of the Spanish sheep dog, 260.
- Trunk, bones of the, 296.
- Tumour, phlegmonous, nature and treatment of, 338.
- Turkish dog, description of the, 252; greyhound, description of the, 246.
- Turnside, nature and treatment of, 297.
- Turnspit, description of the, 284.
- Turpentine, uses of, 384.

- UNGUENTS**, use of, in mange, 376.
Unguiculata, a tribe of animals, 227.
Uterus, case of inversion of the, 366; extirpation and cure, 366.
VAGINA, polypus in the, 328.
Van Dieman's Land, ravages of wild dogs in, 233.
Varieties of the dog, three divisions of, 228; first division of, 228; second division of, 247; third division of, 284.
Vatel, his observations on the pulse of different animals, 339.
Vegetating excrescences in the ear, nature and treatment of, 325.
Vermifuge, glass the most effectual, 359, 371.
Vertebrated animals, what, 227.
Vinegar, useful for fomentations, 382.
Voice, change of, in rabies, 310.
Vyner, Mr., opinion on kennel lameness, 272.
WARTS, treatment of, 377.
Washing of hounds, disapproved of, 273.
Watch-dog, frequent ill-usage of the, 294.
Water spaniel, description of the, 249; anecdotes of the, 249.
Wild dog, description of the, 229; of Africa, 234; of Australia, 232; of Van Dieman's Land, 233.
Williamson, Captain, account of the wild dogs of Nepal, 230; on the degeneration of dogs in India, 230; description of the dhole, 230.
Wolf, supposed to be the origin of the dog, 222; anecdotes of the, 222.
Wolf-dog, Irish, 245; Italian, 263.
Worming the tongue, a useless practice, 333.
Worms, varieties of, 359; symptoms of, 359; means of expelling, 359; cases of, 359; a cause of sudden death, 360; causes of, 360; a cause of epilepsy, 298; a cause of distemper, 371.
YELLOW distemper, 235; treatment of, 372.
Yellows, the, 354.
ZINC, sulphate of, a valuable excitant, 384.
Zoological classification of the dog, 227.

INDEX TO THE HOG.

- ABORTION rare in the case of sows, 492.
 Abyssinia, wild boars of, 417.
 Abyssinian wart hog, description of the, 402.
 Acarus, a minute insect, the cause of mange, 491.
 Accommodation, what proper for the pig, 475.
 Acorns used as food for, 437, 481, 482.
 Æthiopian hog, 401.
 Æthiops' mineral, useful in leprosy, 401.
 African boar, cross of, with a common pig, 433.
 African black pig, cultivated in Germany, 455.
 Agriculture, *Quarterly Journal of*, doubts of a writer in, whether swine be a profitable stock, 450.
 Alderney, importance of the pig in, 470.
 Alemejeo, large flocks of swine of the, 456.
 America, domestic breed of hogs of, 459; large hog establishments of, 451; herds of pigs of, 432.
 Anecdotes of the swine of Spain, from 'A Summer in Andalusia,' 456.
 Anoplotherium, remains of the, 389; description of the, 390; teeth of the, 390.
 Anthracotherium, fossil species of, 390.
 Antimonial powder, useful in inflammation of the lungs, 489.
 Aper Æthiopicus, 401.
 Apoplexy, symptoms of, 488; for treatment of, see inflammation of the brain.
 Apples, given to swine in America, 482.
 Aristobulus, anecdote of the siege of Jerusalem by, 434.
 Ashes, occasionally given to pigs, 482.
 Asia, the hog neglected throughout the greater part of, 458.
 Asphalte, recommended for the paving of piggeries, 477.
 Auge, Pays d', description of the pigs of, 453.
 Azara, on the two species of peccary, 403.
 BABIRUSSA, the genus, 393; alfurus, 397; peculiarities of, 397; dental formula of, 397; description of the, 398; erroneous description of the, 398; localities of the, 397, 399; specimens of the, rare, 398; habits of the, in captivity, 399.
 Babyroussa, le, 397.
 Bacchus, Egyptian sacrifice of swine to, 435.
 Bacon, deficiency of, in the market, 449; hog, usual time for killing, 485; Irish, present inferiority of, 470; smoked, taste for, confined to London, 465.
 Bakewell, Mr., improvements in domestic swine by, 464.
 Banded wild hog, description of the, 395.
 Barley-meal, rapid increase in the weight of pigs fed on, 480.
 Bath, hot, useful in enteritis, 489; in inflammatory epidemics, 487; in peritonitis, 489; in tetanus, 490.
 Bavaria, remarkably small breed of pigs of, 455.
 Beans, very good for fattening swine, 481.
 Bearded wild hog, description of the, 394.
 Bedfordshire pigs, 469.
 Beechmast, a good food for store pigs, 481.
 Beet-root, used as food for pigs, 479.
 Bell, Sir Charles, his description of the boar's head, 392.
 Bell, Mr., his notice of the boar among the beasts of venerie, 409.
 Berkshire breed of pigs, description of the, 465; wide dispersion of the, 465; improved breed of hogs, 464; hog in great request in America, 460.
 Berners, Dame Juliana, lines from 'The Book of St. Albans' of, 411.
 Bleeding, different modes of, 486; useful in bronchitis, 489; in enteritis, 489; in inflammation of the lungs, 489; in leprosy, 491; in peritonitis, 489; in quincy, 488; in tetanus, 490.
 Blisters, useful in quincy, 488.
 Bloomfield, on the hog's eagerness for acorns, 437.
 Boar, the domestic, a dangerous animal, 445; instances of the ferocity of the, 445; wild, adopted as the cognizance of ancient families, 411; extirpation of the, from the forests of England, 409; best age of the, for breeding, 446.
 Boar's head, the, anecdotes proving the high estimation in which held, 413; a trophy of victory, 412; used as a crest, and a sign for houses of entertainment, 413.
 Boar-hounds, description of, 415; hunt, description of a, from Egan's 'Sporting Anecdotes,' 415; hunting, description of, 412; not obsolete, 414.
 Boar-hunting, modern attempts to restore, 414.
 Bones, frontal and parietal, of the hog, 393.
 Borrow, Mr., on the swine of the Alemejeo, 456.
 Bosco, pigs of, description of the, 457.
 Bosch-vark, or masked wild hog, 396.
 Bothnian breed of pigs, 455.
 Boulogne, race of pigs of, 453.
 Bowels, inflammation of the, 489.
 Brachial vein, best place for bleeding pigs, 486.
 Brain, inflammation of the, see Phrenitis.
 Brazil, feral swine in, 432.
 Breed of swine, improvements in the, 448; changes which have taken place in, 470, 474.
 Breeding, principles to be observed in the selection of stock for, 475; in and in, not approved with respect to swine, 446; sow, directions for the management of a, 447.
 Bressane breed of pigs, description of the, 454.
 Brewery, refuse of the, not calculated for the sound fattening of pigs, 479.
 Brine, poisonous to pigs, 482.
 Bristles, 475; average weight of, 452; of the hog, uses and value of the, 452.
 British Islands, principal breeds of pigs of the, 462.
 Bronchial tubes, inflammation of the, 489.
 Bronchitis, symptoms and treatment of, 489.
 Brook, Mr., his description of the wild hog of Borneo, 395.
 Bruce, on the wild boars of Abyssinia, 417.
 'Bubbles from the Brunnens of Nassau, extracts from the, on German pigs, 439, 441.
 Buckwheat, not generally cultivated in England, 481; meal excellent for fattening pigs, 481.
 Buffon, M., his doubts as to the real affinities of the hog tribe, 390; his directions for boar-hunting, 414.
 Bullock, Mr., on the management of pigs in Mexico, 460; on the singular purpose to which hog's skin is applied, 461.
 Butter-milk, highly nutritious for pigs, 478.
 Cabbages, useful in feeding pigs, 479.
 Calcareous matters, beneficial to pigs, 482.
 Calomel, useful in enteritis, 489; in epilepsy, 488; in fevers, 487; in peritonitis, 489.
 Canada, importance of the hog in, 460.
 Canine madness, see Rabies.
 Cape of Good Hope, the pig of, 459.

- Cape Verd, wart hog of, 403.
 Caraways, oil of, useful in bronchitis, 489.
 Carrots, used as food for pigs, 479.
 Castor oil, useful in colic, 490; in enteritis, 489; in fevers, 487; in phrenitis, 487; in tetanus, 490.
 Castrating, the best time for, 484; treatment after, 484.
 Catarrh, nasal, causes, symptoms, and treatment of, 488.
 Cattle show, pigs at the, of 1847, 450.
 Cerealia, the, what meant by the term, 480.
 Ceylon, hog's flesh in great request in, 459.
 Champagne, race of pigs of, 453.
 Channel Islands, breed of pigs in the, 470.
 Charles I., his attempt to restore boar-hunting, 413.
 Chestnuts, used for feeding pigs on the continent, 482.
 Chicory, useful in feeding pigs, 479.
 China, immense number of pigs reared in, 452.
 Chinese, the, extensive breeders of pigs, 458; breed of pig, cultivated in Germany, 455; pig, advantages of crossing our breeds with, 473; description of the, 458; difficult to rear, 473; naturalised in England, 473; few pure now in England, 474; pork, description of, 458.
 Chloride of lime, use of as a disinfectant, 490; in leprosy, 491.
 Chæropotamus, remains of the, 390.
 Cincinnati, annual fair in, pigs exhibited at the, 451.
 Cinders, occasionally given to pigs, 482.
 Cleanliness, bad effects of neglecting with respect to pigs, 475.
 Clover, useful in feeding pigs, 479.
 Cochrane, Mr., his account of the danger of hunting swine, 432.
 Colic, causes, symptoms, and treatment of, 490.
 Collared Peccary, the, 405; characters of the, 406; description of the, 406; fossil remains of the, 406; habits of the, 405; odour of the, 406.
 Colour, different in different breeds of pigs, 475.
 Columbia, feral swine of, 432; ferocity of the, 432.
 Combat with a wild boar, as related by Mr. Hay, 422.
 Condé, Prince of, kept dogs for boar-hunting, 415.
 Contagious inflammatory epidemics, 487; causes, symptoms, and treatment of, 487; appearances presented on a post-mortem examination, 487.
 Corn-mill, refuse of the, useful in feeding pigs, 478.
 Craon breed of pigs, description of the, 454.
 Crested wild hog, description of the, 394.
 Cross breed of pigs, various kinds of, 496; between the French and those of different countries, 453.
 Croton oil, useful in fevers, 487; in phrenitis, 487.
 Culley, Mr., his description of an enormous hog, 463.
 Culley, Mr. George, on a breed of pigs which prevailed in Yorkshire and Lancashire, 463; on the Chinese pig, 473; on the Highland or Irish breed of pigs, 474.
 Cuvier, M., on the unwholesome nature of swine's flesh in hot climates, 435; on the vertebræ of the wild hog, 394.
- DAIRY, refuse of the, most important in fattening pigs, 478.
 Daniel, his account of a sow trained to stand at game, 443.
 Darwin, Dr., on the effect of a cold wind on pigs, 444.
 Desmarest, on the dimensions of a wild boar, 431; on the domestic hog of Africa, 459; on the principal breeds of pigs in France, 453.
 Diarrhœa, causes and treatment of, 490.
 Dicotyles, the genus, 393, 403; characters of, 403; first separated from the genus *sus* by Cuvier, 403; two species of, only known, 403.
 Diet, a most nutritious for fattening pigs, 478.
 Digitalis powder, useful in inflammation of the lungs, 489.
 Diseases of swine, 486.
 Distillery, refuse of the, not a beneficial food for pigs, 479; ought to be given cautiously, 479.
- Domestic hog, distinctive peculiarities of the different breeds of, 432; improvements which have taken place in the different breeds of, 470.
 Drenching, difficulties of, 486.
 Dung of the hog, valuable as manure, 453.
- EARTH, necessarily swallowed by pigs, acts beneficially on the stomach, 482.
 Egyptians, ancient, their detestation of the hog, 435.
 Embrocations useful in tetanus, 490; irritant, useful in quincy, 488.
 Emetics recommended by some in cases of catarrh, 488.
 Engallo, 401.
 English and French pigs, comparison between, 454.
 Enteritis, causes, symptoms, and treatment of, 489.
 Enemas, useful in enteritis, 489; in epilepsy, 488; in cases of fever, 487; in inflammatory epidemics, 487; in peritonitis, 489; in phrenitis, 487; in tetanus, 490.
 Epilepsy, cause, symptoms, and treatment of, 488; the pig should be kept separate from his companions during an attack of, 488.
 Essex, breed of pigs of, 468.
 Europe, wide dispersion of the domestic breed of swine of, 461.
 Eyton, T. C., Esq., his observations on the osteological peculiarities of the various breeds of the hog, 432.
- FARINACEOUS food essential in fattening pigs, 480.
 Fat, value of the, of the hog, 448.
 Fertility, the strain from which the breeder selects his stock ought to be noted for, 475; is hereditary, 475; noted in swine, 445.
 Fever, pigs liable to attacks of, 486; treatment of, 487.
 Fine imposed on those who kill pigs during the hot months in Spain and Italy, 456.
 Flesh of the Indian jungle-hog superior to any of the domestic varieties, 419.
 Fomentations useful in enteritis, 489; in peritonitis, 489.
 Food, attention of, highly desirable in feeding swine, 478.
 Form, what meant by, as applied to the pig, 475; the best for a breeding boar, 446; for a breeding sow, 447.
 Fouilloux, Jacques de, his advice on boarhounds, 414; anecdote related by, 415.
 France, boar hunting in, as described by Mr. Tolfrey, 426; inferiority of the pigs of, 453.
 French pig breeder, unsuccessful trials of a, to improve his stock, 454.
- GERMANY, the hog in great request throughout, 455; mode of feeding pig in, 439.
 Gestation, period of, variable in the sow, 445.
 Gilpin, on the mode of feeding swine in the New Forest, 438; on the pigs of Hampshire, 414; on the wild breed of pigs of the New Forest, 466.
 Ginger, useful in colic, 490; in leprosy, 491; tincture of, useful in phrenitis, 487.
 Glands of the throat, inflammation of the, symptoms and treatment of, 488.
 Gluttony of the hog, 442.
 Guernsey, importance of the pig in, 470.
 Guinea, New, wild hog of, 459; description of the hog of, 459.
 Greek and Romans devoted to boar-hunting, 414.
- HALLUF, 402.
 Hampshire, breed of pigs of, 465; difference between the common, and the wild breed of the New Forest, 466.
 Hartley, Rev. Mr., anecdote from the 'Researches in Greece,' of, 417.

- Haruja, 402.
- Hay, John Drummond, Esq., anecdotes of boar-hunting, from 'Western Barbary,' of, 421.
- Hay-tea, excellent for pigs mixed with other food, 482.
- Head, Captain, on dragging pigs along by means of the lasso, 461.
- Hebrews, their aversion to the hog, 434.
- Henderson, Mr., his account of training pigs for the saddle, 443; directions for the accommodation of pigs, 476.
- Hepatitis, or inflammation of the liver, 490.
- Herodotus, on the aversion of the Egyptians towards swine and swineherds, 435.
- Hibbert, Dr., on the tenures on which swine were fed in woods, 437.
- Hide of the hog, uses of the, 452.
- Highlands, semi-wild pig of the, 474.
- Hippohyus, fossil species of, 390.
- Hoel Dha, his laws relating to swine, 438.
- Hog tribe, the, 389; certainty of the origin of the, 389; domestic, 432; different breeds into which it has ramified, 453; estimation in which held in England, 436; errors regarding the filthiness of the, 442; is omnivorous, 442; selection of, for breeding, of primary importance, 446; wild, 407; fossil remains of the, 408; at what period reclaimed, uncertain, 434.
- Hog's bristles, an article of export from Russia and Prussia, 452; fat, or hog's lard, analysis of, 448.
- Hogs fattening for bacon, management of, 485; should be fed at regular intervals, 485; should be washed and brushed, 485; quantity of food necessary for, 485, 486.
- Holished, extract from the 'Chronicles of Scotland,' of, 411.
- Homer, his mention of the wild-boar, 414.
- Horace, on boar-hunting, 414.
- Howitt, Mr., on wild swine in Germany, 415.
- IGNORANCE respecting the swine of Spain and Portugal, 457.
- India, jungle hog of, 418.
- Inflammation of the abdominal cavity, 489; of the bowels, 489; of the brain, 487; of the bronchial tubes, 489; of the glands of the throat, 488; of the liver, 490; of the lungs, 489; of the mucous membrane of the nose, 488; of the peritoneal coat of the intestines, 489; of the spleen, 490.
- Inglis, Mr., on the pigs of the Irish cabins, 471; on striking a bargain in an Irish pig-market, 472.
- Intelligence of the pig, generally underrated, 441.
- Ireland, pigs of, 470; pig trade in, 472; kind treatment of the pig in, 471; large proportion of the pigs reared in, sold in the English markets, 471.
- Irish bacon, inferiority of, compared to English, 472; improvement in, 472; pigs, expense and mode of conveyance of, into England, 472; importation of, into Great Britain, 471; improvement in, 470; Poor-Law Inquiry, Reports of the Assistant Commissioners under, extract from, showing the importance of the pig to the peasantry, 471.
- Isle of Man, pigs of the, 470.
- JALAP, useful in epilepsy, 488; in fevers, 487; in phrenitis, 487.
- Japanese, the, extensive breeders of pigs, 458.
- Jersey, pigs in, 470.
- Johnson, Mr., on the terror with which the jungle-hog inspires horses, 420; on the wild boar of India, 418.
- Jungle-hog, bed of the, how constructed, 419.
- Jutland pig, description of the, 455.
- KEATS, Mr., on the destruction of oak-woods, 481.
- Keppel, Capt. the Hon. H., on the wild hog of Borneo, 395.
- Kitto, Dr., on the wild boars of Palestine, 417.
- LANCET, should be instantly resorted to in apoplexy, 488.
- Lard, analysis of, 448.
- Laws, arbitrary, laid down respecting wild boars, 409.
- Lay, Mr., his description of Chinese pork, 458; mode in China of transporting pigs from place to place, 458.
- Leicester, new breed of pigs, 464.
- Leprosy, causes, progress, and symptoms of, 491; treatment of, 491.
- Lesson on the Papuan wild hog, 395.
- Le Vaillant, his description of a monstrous wild boar, 401.
- Lice, mode of removing, 491.
- Lime water useful in destroying the parasitic worms in bronchitis, 489; use of, in leprosy, 491.
- Lincolnshire, noted for an excellent breed of pigs, 467; description of the breed of pigs of, 467.
- Linseed cake, occasionally given to pigs, 481; meal, sometimes given in small quantities to pigs, 481; oil, useful in bronchitis, 489; use of in mange, 491.
- Lion, anecdote of a combat of a, with a boar, 421.
- Liver, inflammation of the, not common in swine, 490.
- Liverpool, pigs brought into the port of, from Ireland, 471; pig market of, English country dealers' attendance at, 472.
- Lloyd, Mr., on the ferocity of a Swedish sow, 416.
- London, cattle-shows of, extracts from catalogues of, 469.
- Lower Brittany, damage done by the wild hogs of, 431.
- Lucern, useful in feeding pigs, 479.
- Lungs, inflammation of the, causes, symptoms, and treatment of, 489.
- Lyell, Mr., on the "hog aristocracy" of Cincinnati, 451.
- MAIZE, little inferior to barley as food for pigs, 480; the various uses of, in the United States, 480.
- Mague, M., his description of the Bressane breed of pigs, 454.
- Magnesia, a little mixed with the wash, occasionally beneficial to pigs, 482.
- Malta, celebrated for a small black breed of pigs, 457.
- Malformations transmissible from generation to generation, 433.
- Manger, the most convenient for pigs' food, 477.
- Mange, cause and treatment of, 491.
- Masked wild hog, description of the, 395.
- Mayenne, pigs reared in, particularly valuable, 454.
- McClelland, Mr., on the existence of the wild hog in Assam, 394.
- Meal, the only form in which barley should be given to pigs, 480; different modes of preparing, 480.
- Measles, causes of obscure, 491; symptoms and treatment of, 491.
- Medicines, best mode of administering to pigs, 486; list of, employed in the treatment of swine, 492.
- Mercurial ointment, useful in mange, 491.
- Mexico, fine breed of pigs of, 460.
- Miscellanea Antiqua Anglicana*, extract from, 412.
- Moldavian breed of pigs, 455.
- Monsters of deformity, more frequently produced by the sow than by any other animal, 492; ignorance as to the cause, 492.
- Moon, the, Egyptian sacrifice of swine to, 485.
- M'Queen, Mr., his statement of the value of live stock in the United Kingdom, 474.
- Mucous membrane of the nose, inflammation of the, see Nasal Catarrh.
- Mud, a protection to the skin of the hog, 442.
- Mutton, analysis of, 448.
- NAPIER, Lieut.-Col. E., his description of the chase of the wild boar, 424; an unsuccessful hunt, 424.
- Neapolitan breed of pigs, celebrated in England, 457; description of the, 457.
- Netherlands, swine of the, 455.

- New Forest, Hampshire, right of feeding swine in, 438.
 New York, pigs of, 460.
 New Zealand, pigs introduced into, by Europeans, 459.
 Nitre, use of in cases of fever, 487; in inflammation of the lungs, 489; in leprosy, 491; in measles, 491; in quincy, 488.
 Norfolk, breed of pigs of, 467.
 Normandy, pigs of, 453.
 Norwood, in 1646, 437.
- OATMEAL, largely given to pigs, 480.
 Oleaginous purgative, useful in enteritis, 489.
 Orkney Islands, pigs of the, 462, 463.
 Osseous framework, extraordinary case of modification of the, 433.
 Ox fat, analysis of, 448.
 Ovaries, removal of the, of the sow, 446.
 Ovid, his description of the wild boar, 414; lines from, descriptive of the chase of the Calydonian boar, 414.
 Owen, Professor, on the fossil remains of the hog, 408.
- PACHYDERMATA, 389; not a fertile race, 445.
 Pachydermatous order of mammalia, what, 389.
 Palestine, wild hog of, 417.
 Pampas, swine largely kept in the, 461.
 Panther, contest of a, with a herd of wild hogs, 431.
 Papuan wild hog, description of the, 395.
 Paraguay, feral swine in, 432.
 Parma, Duchy of, fine breed of swine of, 457; hams and sausages of, 461.
 Parsnips, used as food for pigs, 479.
 Parturition, cases in which surgical aid is necessary, 492; treatment during, 492.
 Paxton, Mr., on the rearing of hogs, by the Jews, 434.
 Peaches given to swine in America, 482.
 Pea-haulm, useful in feeding pigs, 479.
 Peas, excellent food for fattening swine, 481.
 Peccaries, structural similarity in the bones of, to those of ruminants, 391.
 Pennant, Mr., on the use of the hog as a beast of draught, 443.
 Penny *Cyclopædia*, extract from, on the osteological differences in domestic swine, 433; *Magazine*, extract from, on pigs in Ireland, 471.
 Perigord, race of pigs of, 453.
 Peritoneal coat of the intestines, inflammation of the, 489.
 Peritonitis, rapidity of the course of, 489; treatment of, 489.
 Petworth, enormous size of a hog bred at, 464.
 Phacocheirus, the genus, 393; dentition of, 400; Africanus, 401; Æliani, 402; Æthiopicus, 401.
 Philippine Islands, pigs plentiful in the, 459.
 Phrenitis, cause, symptoms, and treatment of, 487.
 Pig-drivers of Germany, emoluments of the, 442.
 Pig, flesh of, held in great estimation by the Greeks and Romans, 436; docility of the, 444; sensitiveness of, to changes in the weather, 444.
 Pig-nut, two sorts in England, 483; tuberous root of, perfectly wholesome, 483; possibility of bringing it into cultivation, 483.
 Pigs, profitable to the labouring peasant, 451; very choice in their vegetable fare, 479.
 Plans for the accommodation of the pigs of brewers, milk-merchants, and farmers, 476.
 Podolian pigs, description of the, 455.
 Poitou, race of pigs of, 453.
 Poland, description of the breed of pigs of, 456.
 Polesino, inferiority of the breed of pigs of, 457.
 Polish pigs, description of the, 455.
 Pollard mixed with vegetables cut up small, a good food for store pigs, 479.
 Pore de Nobles, description of the, 453; le, Turc, description of, 455; de Witt, description of the, 454; de Zéland, description of the, 454.
- Porcus Babirusa, 397.
 Pork-butchers, increase of, in England, 451, 472.
 Pork, fresh, great demand for, 451; a profitable article of trade, 451; improvement in, 452.
 Porkers, feeding and management of, 484; proper time for killing, 484.
 Portugal, pigs not numerous in, 456.
 Potatoes, not good for fattening pigs, 471; useful for pigs, when cooked and mixed with other food, 479.
 Poultry, useful in quincy, 489.
 Pregnancy, treatment of the sow during, 491.
 Prussia, swine of, 455.
 Pumpkins, given to swine in America, 482.
- QUEEN'S COLLEGE, Oxford, boar's head placed on the table of, on Christmas Day, origin of the custom, 413.
 Quincy, see Inflammation of the glands of the throat.
 Rabies, symptoms of, 490; precautions to be taken, 490.
 Radnor, the Earl of, pigs exhibited by, 480; pigs fed by, 485.
 Ravages committed by the wild boar, 416.
 Rice, occasionally used for fattening pigs, 481; proper mode of preparing, 481.
 Ringing of pigs, generally considered necessary, 484; best time for, 484.
 Rome, quantity of pork consumed at, 458; supplied with bacon from Gaul, 458.
 Romans, ancient, perfection to which the breed of pigs was brought by the, 457.
 Roots given to pigs, 479.
 Ropes, made of the bristles of the semi-wild swine of the Orkneys, 452.
 Rudwick breed of pigs, 463.
 Ruminantia, 389.
 Russia, description of the breed of pigs of, 456.
 Rye meal, pigs occasionally fed on, 481.
- SACRIFICE of wild boars by the Greeks and Romans, 416.
 Sainfoin, useful in feeding pigs, 479.
 Sal ammoniac, use of, in phrenitis, 487.
 Salt, essential to the health of pigs, 482; common, mixed with lime-water, useful in bronchitis, 489.
 Salts, useful in epilepsy, 488; in fevers, 487; in tetanus, 490; Epsom, useful in inflammation of the lungs, 489.
 Sanglier, le, des Indes Orientales, 397.
 Sark, importance of the pig in, 470.
 Saxon Dialogues, conversation from, on hunting, 410.
 Saxon dominion in England, wild boar abounded during the, 409.
 Schenkus, an instance given by, of the effect of eating the flesh of a pig who died rabid, 490.
 Schomburgh, M., his account of an encounter with *kairouines*, 405.
 Scott, Sir Walter, lines from, on the changes in forest scenery, 409; his lines in allusion to a wild sow, 411; his account of the eagles of the Orkney Islands, 432.
 Scotland, districts of, formerly frequented by the wild boar, 411.
 Scrofula, supposed to be perpetuated by eating the flesh of the hog, 435.
 Scrubbing pigs, utility of the custom, 442.
 Seeds of various vegetables used for feeding pigs, 481.
 Senna tea, given to pigs in fevers, 487.
 Seton, useful in inflammation of the lungs, 489; in inflammatory epidemics, 487.
 Shakspeare, his description of an angry chafing boar, 412.
 Sheeps' fat, analysis of, 448.
 Short-legged or smooth pig, description of the, 453.
 Siam breed of pigs, cultivated in Germany, 455.
 Sibbald, Sir Robert, extract from 'Fife' of, 411.
 Skeleton, modifications in the, transmissible from generation to generation, 433.

- Skim-milk highly nutritious for pigs, 478.
- Slaughter-house, refuse of the, most improper food for pigs, 478.
- Slut, a sporting pig, 443.
- Smith, Dr., his description of the wart hog, 401.
- Sonnini, M., his description of a herd of peccaries, 404; on the wild boars of Palestine and of Egypt, 417.
- Soot, decoction of, in water, useful in mange, 491.
- South African Phacochoere, 401.
- South America, feral hog of, 431; genus of *suidæ*, peculiar to, 393.
- South Carolina, pigs of, 460.
- South Sea Islands, pigs of the, 432.
- Sow, instance of a, reared by hand, 483.
- Sows, destruction of their offspring by, 444.
- Spain, gypsies of, their destruction of swine, 456; pigs not numerous in, 456; hams of superior quality produced in, 456.
- Spanish black pig, cultivated in Germany, 455.
- Sparrman, M., on the masked wild hog, 396; his description of a herd of *bosch-varkens*, 396; on wood-swine, 397.
- Spaying, the best time for, 484; treatment after, 484.
- Spear, seldom used in boar-hunting, 415.
- Spleen, inflammation of the, symptoms of, 490; treatment the same as for peritonitis, 490.
- Splitting the nose of pigs recommended by some, 484.
- Starch manufactory, refuse of the, said to be available in feeding swine, 478.
- Store-pigs, feeding and management of, 485.
- Strangles, see Inflammation of the Glands of the Throat.
- Strutt, Mr., extract from the *Anglo-Saxons* of, relating to the wild boar, 410.
- Sty, best mode of constructing, 475.
- Sucking-pigs, 483; best mode of feeding, 483; profit arising from, 483; when necessary to feed, 483; food and treatment of, 484.
- Suidæ*, the genus, 389; description of the, 391.
- Sus, the genus, dentition of, 393.
- Suffolk, breed of pigs of, 467.
- Sulphur useful mixed with food of pigs, 485; use of in inflammation of the lungs, 489; in leprosy, 491; in measles, 491; in phrenitis, 487; ointment, useful in mange, 491.
- Sus Babirussa, 397; *Fasciatus*, specimen of, in the British Museum, 397; *Æthiopicus*, 401.
- Sussex, breed of pigs of, 463.
- Swine, not cloven-footed, 390; description of the feet of, 390; female wild, maternal affection of the, 415, 416; flesh of, unclean, 434; breeding of, principles on which it should be conducted, 445, 446; importation of live, from Ireland into England, 449; general management of, 475.
- Sweden, wild swine of, ferocity of the, 416; description of the breed of pigs of, 456.
- Swedish turnips, a cheap food for pigs, 479.
- Sykes, Colonel, on the wild hog of Dukhun, 394.
- TAHITI, pigs of, 459; mode of cooking the, by the natives, 459.
- Tares, useful in feeding pigs, 479.
- Tariff, alterations of, favourable to the importation of foreign bacon, &c., 449.
- Tartar emetic, ointment of, useful in inflammation of the lungs, 489; in quincy, 488.
- Tagnicati, 404.
- Teats, number of, requisite for a breeding sow, 475.
- Tetanus, causes and treatment of, 490.
- Thäer, M., on the chief breeds of pigs in the North of Germany, 455.
- Thornton, Colonel, pointer pig in the possession of, 444.
- Tobacco, infusion of, useful in leprosy, 491; water, useful in mange, 491.
- Tolfrey, F., Esq., dogs of, 426; scenes of boar-hunting detailed by, 426; serious accident in boar-hunting related by, 426.
- "Tristan," an ancient book upon venerie, 411.
- Trollope, Mrs., on the hogs of Cincinnati, 450.
- Truffles, the pig trained to hunt for, in Italy, 443.
- Turner, Sharon, on the food of the Anglo-Saxons, 436.
- Turnips, used as food for pigs, 479.
- Turpentine, spirit of, useful in bronchitis, 489.
- Tusks of the *babirussa*, different opinions respecting the use of, 399.
- UNGUENT, a good for leprosy, 491.
- Unguents, irritating, useful in tetanus, 490.
- United States, the hog reared in abundance in the, 460.
- Urine of the hog, its value as manure, 453.
- VALLEY-BREED of pigs, description of the, 454.
- Vancouver, Mr., on the management and value of hogs, 450.
- Vegetables, dried and green, useful as food for pigs, 479.
- Venerie, beasts of, protected by royal edicts, 409.
- Vertebræ, table showing the different number of, in various breeds of the hog, 433.
- Vetches, useful in feeding pigs, 479.
- Vinegar, use of, in inflammatory epidemics, 487; phrenitis, 487.
- Virgil, lines from, on the "Bristled Boar," 416.
- Vlacke-vark, 401; two specimens of the, at the Hague, 402; description of the, 402.
- WALLACHIAN breed of pigs, 455.
- Warren, Mr. George, his opinion respecting the Mosaic prohibition against the flesh of swine, 435.
- Wart hog, the South African, 401; characters of, 401.
- Warted wild hog, description of the, 395.
- Waterton, Mr., his notice of the feral swine of the New World, 431; picture of a Roman slaughter-house, 453.
- Weaning pigs, best mode of proceeding in, 483; proper age for, 483.
- Weight to which hogs may be fed, 463.
- Western, Lord, improved breed of Essex pigs established by, 463.
- Westphalia, breed of pigs of, 455; hams of, 455.
- Whey, highly nutritious for pigs, 478.
- Whitaker, Rev. J., on the immense forests of Great Britain, 410.
- White, Gilbert, instance of the fecundity of a sow given by, 446.
- White-lipped peccary, description of the, 404, 405.
- Wild boar, habits of the, 416; prevalence of the, in England, during the British, Roman, and Saxon periods, 410.
- Wild hog, the banded, 395; the bearded, 394; the crested, 394; the common, 393; the masked, 395; the Papuan, 395; the warted, 395.
- Williamson, Captain, on the activity of the wild hog, 419; on dislodging the wild hog from cane plantations, 420; on the jungle hog of India, 418.
- Wilson, Mr., on the wide distribution of the domestic hog, 432.
- Wiltshire, celebrated for bacon, 465; description of the hog of, 465.
- YOUATT, Mr., instances of swine trained for harness given by, 443; on the keeping of swine, 450.
- ZEALAND breed of pigs in great esteem in Holland, 455.
- Ziphodon, remains of the, 389.

INDEX TO POULTRY.

- ALBUMEN, the, 528; benefits resulting from the presence of the, 529.
- Aldrovandus, his notice of the Japan peafowl, 563.
- Allantois, the, 529.
- Almond tumbler, description of the, 586.
- America, the introduction of the Guinea-fowl into, 565.
- Amniotic sac, the, 529.
- Anas, bill of the genus, 584.
- Anatidæ, characteristics of the family, 581, 582; mode of flight of the, 581; peculiarities in the construction of the trachea of, 582; sections of the family, 583.
- Anatinæ, the sub-family, 583; modifications in the form of the bill of, 583.
- Animals, the former range of many, much circumscribed, 503.
- Anser, the true goose, 596.
- Anserinæ, the sub-family, 593.
- Apoplexy, 544; attacks generally sudden, 544; cause of, 544.
- Argus pheasant, specimens of the, in the Chinese Exhibition, 505.
- Artificial heat, chickens hatched by, 537; experiments of in England and France, 537; climate of England not favourable to, 537.
- Asthma, cause of, 545.
- Audubon, M., his account of the migrations of turkeys, 552; of the hatching of a brood of turkeys, 553; of the attack of a Virginian or great horned owl on a flock of turkeys, 554; his description of the passenger-pigeon of North America, 575; his observations on the summer-duck of America, 582.
- Australia, the swans of, 591.
- Aves, three distinct orders of the class, 498.
- Aviary, description of the, at the Royal Home Farm at Windsor, 523.
- Aylesbury breed of ducks, the white, 588.
- Azam-alas jungle fowl (*gallus furcatus*), the, 508.
- BACKER, Madame, turkeys in the aviary of, 555.
- Baldhead pigeon, 580.
- Bankiva jungle fowl, the, the main source of our bantam breeds, 505.
- Bantam, the town of, 505.
- Bantam fowl, importation of the, into England, 505; many varieties of the, in Europe, 514; Sir John Sebright's breed of the, characters of, 514; pure white kind of, 514.
- Bantams, not practically useful, 515.
- Barb, the, what, 601; description of the, 579.
- Barn-door fowl, application of the term, 515.
- Barn-door fowls, young, great demand for, 518.
- Bartlett, Mr., his description of the grey-lag goose, 597.
- Baskets of wicker-work, the best receptacles for nests, 523.
- Bean-geese (*anser ferus*), characteristics of the, 596; habits of the, 596.
- Bearded tumblers, 580.
- Beatson, Mr., his opinion of the requisites for the keeping of poultry, 522.
- Bennett, Mr., his account of the crested guan, 569; his observations on the domestication of curassows, 567.
- Berne, people of, their knowledge of the art of hatching chickens by artificial heat, 537; their mode of proceeding, 537.
- Bewick's swan (*cygnus Bewickii*), range of the, 591.
- Bill of the anatidæ, 582.
- Bill-scale, the, 531.
- Black fowl, characters of the, 514; necked swan (*cygnus nigricollis*), range of the, 591; Poland fowl, the, 511; swan (*cygnus atratus*), range of the, 591.
- Blastoderma, the, 528.
- Bloom, Mr. William, young wild turkeys reared by him, 551.
- Borax, use of, in pip, 544.
- Bowels, constipation of the, 545.
- Breeds of fowl, the best to select for keeping, 520.
- Britain, queries concerning the first introduction of the fowl into, 502; the fowl domesticated in, before the Roman invasion, 502.
- Brittany, the short-legged bantam fowl of, 515.
- Bronzed cock of Sumatra (*gallus ceneus*), description of the, 507.
- Broody hens, what, 512.
- Bucknell, Mr., the inventor and proprietor of the eccaleobion, 539; his opinion of its utility, 540.
- Buffon, M., his notice of the musk duck, 590.
- Bullock's museum, account of the Honduras turkey presented to, 549.
- CALOMEL, use of in gapes, 545.
- Canino, the Prince of, his account of the weight of the wild turkey, 551.
- Canada goose (*anser Canadensis*), migrations of the, 593; immense range of the, 593; description of the, 594; flight of the, 594; food of the, 594; the roosting places of the, 594; too much neglected as a bird of utility, 594; under domestication, 594.
- Cantelo, Mr., his "model poultry farm," 540; on artificial incubators, 540; on the *hydro-incubator*, 541.
- Carnivora, the species of, subjected to man, 493.
- Capons, trained for nurses, rare in England, 535; trained to act as nurses to broods of chickens, 535; common in France, 535; instances of, known to the ancients, 535; various modes of, 536; practice of making in England not extensive, 543.
- Capuchin pigeon, the, 580.
- Carrier pigeon, the, or horseman, description of, 577; average speed of, 578; instance of the velocity of, 578; ancient use made of, 578; present use made of, 577; probably degenerated in England, 579; price often given for a pair of, 577.
- Castor oil, useful in pip, 544.
- Caux, variety of fowl in the peninsula of, 516.
- Cayenne pepper, useful in moulting, 546.
- Census returns in Ireland for 1841, value of poultry, 518.
- Cereopsis goose of Australia, the, 582.
- Chalaza, the, 528.
- Chauliodus, bill of the genus, 583.
- Chapel Bampton, prize fowls exhibited in the poultry-show at, 519.
- Cheetah, the, to all intents and purposes a wild beast, 493.
- Chenalopec, characteristics of the genus, 602.
- Chick, instances of the, perishing in the egg, 533; glued to shell, causes of, 533; mode of extricating the, 533; more frequent in domestic than in wild birds, 533; indications of, 533; operation of extricating often useless, 533; mode of exit of the, from the shell, 531; the, after its exit from the shell, 533; treatment of, 534.
- China, the artificial incubation of eggs in, 589.

- Chinese ducks, discipline in which they are trained; exhibition, specimens of the gallus Bankiva in the, 505; swan-goose, description of the, 595; extensive spread of the, in its wild state, 595; singular instance of the attachment of a, to a pointer dog, 595, 596; varieties in the colour of the, 595.
- Christmas, chickens ready for the table at, care necessary to obtain, 526.
- Citricula, the, 528.
- Cleanliness, the importance of, in a poultry yard, 522.
- Cloaca, the, 528.
- Cob, a popular term for the male swan, 592.
- Cobbett, W., mode of fattening turkeys recommended by, 558; plan of keeping winter laying hens recommended by, 519.
- Cochin-Chinese fowls, the, see Great Malay.
- Cock, selection of a, 525; age at which he should be introduced to his seraglio, 525; the proper method of introducing, 525; fighting, 508; choice of a cock for, 509.
- Cocks, bad propensities of some, 525; management required for two, or more, 525; method of increasing the stock of, 525.
- Columbine order, the, 570; wide spread of the, 570.
- Cracidae, the family, characteristics of, 566.
- Cramming geese, barbarity of the practice of, 602; turkeys, the mode of, 559; well-fed, uselessness of the, 559; turkey-chicks, uselessness of the practice of, 557.
- Cravat goose, the, see Canada goose.
- Crax, the genus, characteristics of, 568.
- Curassos, arboreal in their habits, 566, 567; directions for naturalising, 567; galeated, colour of the, 568; the, easily domesticated, 568; the, and the crested most fitted for the experiment of domestication, 569; habits and manners of the, 568; crested, beauties of the, 569; habits of the, 568; range of the, 568; guan, description of the, 569; difference between the male and female, 570; the globeose, 570.
- Cushat, see Ring-dove.
- Cuvier, M., a portion of his description of the Honduras turkey, 549.
- Cygnets, young swans, 592.
- Cygnina, the sub-family, 591.
- Cygnus anatoides, range of, 591.
- DAFILA, bill of the genus, 584.
- Decoy-ducks, the use of, 587; man, proceedings of the, 587.
- Decoys, management of, in fenny countries, 586, 587.
- Dendronessa, bill of the genus, 585.
- Derby, game breed of fowls possessed by the Earl of, 509.
- Diarrhoea, simple, treatment of, 545.
- Dickson, Mr., fattening for turkeys recommended by him, 559.
- Diseases of fowls, 543; ignorance respecting the treatment of the, 544; little attention paid to the, 544.
- Diving ducks, amazing strength of the gizzard of, 582.
- Domestication, changes of form produced in fowl by, 504.
- Domestic animals, advantage of understanding the nature of the, 603; birds, obscurity of the early history of, 494, 497; common goose, the, 598; duck, habits of the, 588; the, not fastidious in its appetite, 588; proper locality for the, 588; pigeons, food of, 581; turkey, the, 555; different coloured breed of the, 555; cock, characteristics of the, 555.
- Dorking fowl, description of the, 513; antiquity of the breed of, 513; the five claws of the, 513; merits of the, 513; prevalence of white in the colour of the, 513.
- Dove-cote pigeons, the, of Western Asia, Syria, and Egypt, 574.
- Dove's dung, reason for the dearth of, mentioned in the Second Book of Kings, 576.
- Doyle, Martin, his opinion of the advantage of a cottager keeping fowls, 519.
- Dragon or Dragoon pigeon, the, a cross between the carrier and an ordinary breed, 579.
- Duck, the common (anas boschas), 585.
- Ducks, various, different modes of feeding of, 582; habits of domestic, much modified, 589; lodging places for, 588.
- Dysentery, caused by want of sufficient nutriment, 601; prescription for the cure of, 545.
- ECCAEOBION, the, description of, 539.
- Egg, change in the, after twelve hours' sitting, 529; at the commencement of the second day, 529; at the close of the second day, 529; on the third day, 529; on the fourth day, 529; on the fifth day, 529; on the sixth day, 530; on the ninth day, 530; on the twelfth or thirteenth day, 530; on the eighteenth or nineteenth day, 530; the, sometimes destitute of a shell, 528; formation of the, 527; the last, laid in a nest by a wild bird, often a failure, 533; cause of, 533.
- Eggs, the average number of, laid by a duck in the season, 588; the practice of putting ducks' eggs under hens, 588; of the Guinea-fowl, 565; of the wild turkey, 553; selection of, for hatching, 527; process of hatching under layers of dung, 538.
- Egg-trade, estimate of the, given in the supplement to the *Penny Cyclopaedia*, 516.
- Egypt, goose, a standing dish in ancient, 602.
- Egypt, mode of hatching chickens by artificial heat in, 537.
- "Egyptian Antiquities," extract from, concerning the representation of ducks on an Egyptian tomb, 589; passage concerning the goose in the, 603.
- Egyptian goose, the, 602; description of the, 603; wide spread of the, 603.
- Egyptians, the ordinary goose probably reared by the, 598.
- Elephant, the, its race not subjected, 493.
- England, in the feudal times, 597; at the present time, 597.
- Everlasting layer, the circumstance from which it receives its name, 512; importance of preserving the breed of the, 512.
- Fancy fowls of different breeds must be divided, 523; pigeons, changes gradually taking place in, 580.
- Fan-tail, or broad-tailed shaker, description of the, 579.
- Farmer, or cottager, importance of poultry to the, 518.
- Farmer's wife or daughter, the, should attend to the management of the poultry, 521.
- Farm-houses, advantages enjoyed by fowls attached to, 521.
- Feathers, extract from the paper on, in the *Penny Cyclopaedia*, 600; loss of, not to be confounded with moulting, 546; treatment of, 546.
- Fire-backed pheasant of Sumatra (*Eupoclamus ignitus*), the, 508.
- Food, the best, for newly hatched chickens, 534.
- Fowl, the common (*gallus domesticus*), 501; domesticated at a very remote period, 501; universal distribution of the, 501; various proofs of the high antiquity of the, 501; house, proper arrangement of a, 522.
- Fowls, facilities for disposing of, 519; disadvantages of confinement for, 524; best mode of killing, 543.
- France, the egg trade of, statistical remarks on, in the *Penny Magazine*, 516; exportations of eggs from, in 1835; the pigeons of, 574; practice of making capons and poulardes common in, 543; of picking turkeys alive in, 558.
- French Turkeys, the, 556.
- Frizzled or Friesland fowl, the, 513; reason for the name, 514.
- Fuller, Mr. Robert, the number of geese killed in one week by, 601.
- GALLINACEOUS birds, characteristics of, 571; order, see Rasores.

- Gallus, the genus, generic characters of, 501; wild species of the genus, locality of the, 503.
- Game cocks, directions for breeding, 509; management of, 509; fowl, the, 508; deterioration in, resulting from the prohibition of cock fighting, 509; merits of, 510; trouble of keeping, owing to their pugnacity, 510.
- Gander, origin of the word, 598.
- Gapes, causes of, 545; modes of expelling the parasitic worms, 544; nature of, 544; treatment of, 545; a remedy for, 603.
- Gaul, the goose common throughout, 598.
- Geese, barbarous practice of plucking for their feathers, 598; the habit of distinct groups of, herding together, 599; the treatment of, 601; and ducks, the profit of, exclusively derived from the flesh and feathers, 521; feeders, the great, in the vicinity of London, management of geese by, 601.
- Genesis, mention of the turtle-dove and pigeon in the book of, 495.
- Gizzard of the order Rasores, description of the, 499; various experiments instituted to test the grinding powers of the, 500.
- Goose, early domestication of the, 598; green, what, 602.
- Goslings, the treatment of, 602.
- Gray-lag wild goose (*anser palustris*), the, 596; occasional visits of, to England, 597; range of, 597; vigilance of, 597.
- Great Malay fowl, the (*gallus giganteus*), 503; colour of, 503; general form of, 503; importation of, into England, 504; manner of resting, 503.
- Greece, the goose common in, 598.
- Green vegetables considered as food for graminivorous birds, 573.
- Guan, the crested, 569.
- Guano, the, of Persia, 575.
- Guiana, the musk ducks in, habits of, 590.
- Guinea-fowl, the, or pintado (*Numida meleagris*), 564; not a common bird, 565; all trace of, lost through the middle ages, 564; careful watching required by, 565; difficulty in tracing the history of, 564; excellence of the flesh of, 565; disagreeable voice of, 566; habits and manners of, 564; method of obtaining a brood of, in June, 565; manner of going to roost of, 566; resemblance between the male and female, 566.
- HARMER, Mr. his observations on the pigeons of Egypt, 575.
- Heart, inflammation of the, 545; not known in the common fowl, 545; progress to perfection of the, 529.
- Heeren, M., his explanation respecting the names Tarshish and Ophir, 497.
- Helmet pigeon, the, 580.
- Hen, cruelty of making her sit several times in succession, 526; maternal affection of the, 535; coop, the use of a, 534; turkey, caution of the, in concealing her eggs, 553; domestic, selection of a, for breeding, 556.
- Henbane, sometimes given to fattening fowls, 543.
- Hens sometimes take a dislike to some particular cock, 525; the diversities among a flock of, 526; question of the proper number of, to a cock, 524, 525; selection of, for sitting, 526; six young, gains to be expected from, when well managed, 521.
- Heron, Sir Robert, his observations on pea-fowl, 562.
- Home, Sir Everard, his account of the gizzard of the turkey, 499.
- Honduras Turkey (*Meleagris ocellata*), 495; the points in which it is inferior to the common turkey, 549.
- Hook-billed duck, the, 589.
- Hooper-swan (*cygnus ferus*), range of the, 591; characteristics of the, 592.
- House-pigeons, 574.
- Hunter, John, his observations concerning the lacteous secretion of some birds, 571.
- Hybrids, between the common fowl and the pheasant, 546.
- Hydro-incubator, table of costs attending the working of a, 541; of gains, 541.
- ICHNEUMON, the, and the ferret, cannot be said to be fairly domesticated, 493.
- Incubation, all artificial means of, disapproved, 539; various methods of inducing a desire for, 526; spot chosen by the peahen for, 562; symptoms of a desire for the task of, 526.
- India, the turkey supposed to be a native of, 547; peafowl extensively kept in, 563.
- Inflammation of the heart, 545; of the lungs, 545; of the mucous membrane of the intestinal canal, 545; peritoneal, 545; of the rump gland, 546; of the trachea, 544.
- Ingluvies, of the order Rasores, description of the, 499; operation of opening the, 499.
- Ireland, census returns of, 1841, of the value of poultry in, 518.
- Irish produce, table of the exports of, 517; turkeys, the, 556.
- Italy, early mention of geese in, 598; the goose common in, 598.
- JACOBINE, or Capper pigeon, description of the, 579.
- Japan peafowl, description of the, 563; plumage of the, 564.
- Javanese jungle fowl, the (*gallus Bankiva*), 505; characteristics of, 505; allied species of, on the continent of India, 505; or Japan peafowl, the, 563.
- Job, mention of the peacock in the book of, 495.
- Jones, Mr., his account of the changes in the egg, 530.
- Jungle, account of an Indian, by an anonymous writer, 560, 561.
- Jungletery district, immense number of peafowl in the, 560.
- KENT, the, Dorking breed of fowl in, 513.
- Kings, mention of the dearth of dove's dung, in the Second Book of, 576.
- Kitto, Dr., his explanation respecting the names Tarshish and Ophir, 497; his observations on dove's dung, 576.
- Kulm fowl, the, see Great Malay; and 510; specimens of, sent to Her Majesty's aviary, 510.
- LACTEOUS secretion, the, common to the parrot tribe, 571; in pigeons, for the nourishment of the young, 571.
- Latham, Mr., his notice of the musk-duck, 590.
- Leadenhall-market, salesmen of, 519.
- Legrand, M., his estimate of the number of eggs annually produced in France, 516.
- Lincolnshire, Pennant's account of the geese in the fens of, 599.
- Linnæus, his adoption of the title meleagris, 547; his notice of the musk-duck, 590.
- London, unfitness of the streets of, for fowls, 522; the wild blue pigeons in, 572.
- Loris, the, attacks of, on the peafowl, 561.
- Lungs, progress to perfection of the, during incubation, 530; inflammation of the, in poultry, always fatal, 554; symptoms of, 545.
- MALACORHYNCHUS, bill of the genus, 583.
- Mamal, or Egyptian hatching-oven, description of a, 538.
- Mammalia, species from among the, subjected to man, 493.
- Maregrave, his notice of the musk-duck, 590.
- Mareca, bill of the genus, 584.
- Markets, great demand for fowls in, 519.
- Markwick, Mr., his account of the propensity of Guinea fowls to resort to the top of high trees, 566.
- Maundeville, Sir John, his notice of a carrier-bird in China, 578.
- McCulloch, Mr., his account of the importance of poultry, 515; his statistical account of pigeons, 574.

- Meleagris, the genus, family of, 548; characteristics of, 549; supposed to be the turkey of the ancients, 547; erroneousess of the theory, 547.
- Membrana putaminis, 528.
- Menagerie, a, not adapted to naturalization, 566.
- Mexico, turkey domesticated in, previous to the Spanish conquest, 546.
- Migrations of the Canada geese, period of the, 593.
- Morier, Mr., his description of the pigeon-houses of Ispahan, 495; his observations on dove's dung, 576.
- Moslems, the duck rarely eaten by, 590.
- Mothers, artificial for chickens, what, 536; advantages of, 536.
- Moulting, is a natural process, 546; treatment of fowls during, 546.
- Mowbray, his description of the interior of a cottage in which ducks are reared, 588.
- Mucous layer, the, 529; membrane of the intestinal canal, inflammation of the, 545; causes, symptoms, and treatment of, 545.
- Musk duck, characters of the, 590; the domestic, 590; description of, 591.
- Mute swan (*cygnus olor*), range of the, 591.
- NATATORIAL order, the, 581; the families into which it is divided, 581; species reclaimed from the, 581.
- Nest of the wild duck, spots chosen for the, 587.
- Nests, proper arrangement of, for poultry, 523.
- New World, the turkey a native of the, 547.
- Norfolk, black race of turkeys, the, 556; the large turkeys sent from, 559.
- North America, the breeds of swans of, 591; wild turkeys abound in, 548.
- Numida meleagris, the genus, characteristics of, 564.
- Nun pigeon, description of the, 580.
- OPHIR, where situated, 496.
- Ourax, the genus, characteristics of, 568.
- Ovary, or egg-producer, the, 527.
- Oviduct, the, 528.
- Oviedo, his mention of the turkey, 546.
- Ovisacs, description of the, 528.
- Ovula, the, 528.
- Owl, the horned, the assaults of the, on turkeys, 554; the manner in which the turkey parries the attacks of the, 554.
- Pachydermata, species of, subjected to man, 493.
- Palestine, great consumption of fowls in, 502.
- Paraguay, the musk ducks in, 590.
- Paris, Dr., his opinion concerning the use of the albumen, 529.
- Parmentier, M., his plan for accommodating 150 hens at roost, in a house twenty feet long, and twelve feet wide, 522.
- Passenger pigeon, the, of America, 579.
- Passerine birds, characteristics of, 571.
- Pâté de fois gras, the barbarous mode of making, 589.
- Peacock, beauty of the, 559; the, introduced into Greece before the time of Alexander, 497; peafowl, the, 559; the cry of, 562; the flesh of, 563; food of, 562; great spread of, 560; habits and manners of, 562; hardness of, 562; peahen, the, 560.
- Peak of Derbyshire, flocks of turkeys in the, 559.
- Peas, vetches, and tares, deleterious to turkeys, 559.
- Pebbles, or stones, practice of swallowing, to assist digestion, 499.
- Pea bird, a popular term for the female swan, 592.
- Penelope cristata, characteristics of the genus, 569.
- Penguin duck, the, 589.
- Pennant, his account of the grey-lag goose, 597; of the operation of plucking geese for their feathers, 600.
- Penny Cyclopædia, instance of the peahen assuming the characteristics of the cock, related in the, 563; various instances of the ancient employment of carrier-pigeons, given in the, 578.
- Peritonitis, 545; rapidity of its course, 545.
- Persia, the dove-towers of, 575; the pigeons of, 575; pigeons kept in the dove-towers of, 574; throne of the king of, 563.
- Persian, or Rumpless fowl, characteristics of the, 513; the flesh of, not good, 513.
- Phases, the different, of the germ-bearing egg, 529.
- Phasianidæ, the family, 501.
- Pigeon, description of the, 571; voice of the, 572; the, easily familiarised, 574.
- Pigeons, the cottager should not keep, unless he can make a profit by the rearing and sale of fancy birds, 521; characteristics of, 571; enormous consumption of food by, 574; their manner of feeding their young, 571; the price given for, 574; the tarsi of, 571; not true perching birds, 571; gyratorial flight of the common, 576; return of, to a certain spot accounted for, 576; method of training to perform long journeys, 577.
- Pink-footed goose (*anser phœnicopus*), characteristics of the, 596.
- Pintail duck, the, 584.
- Pip, or thrush, 544; treatment and symptoms of, 544; is symptomatic, 544.
- Pipe, the, in decoys, 586.
- Pliny, his account of the pilgrimage of flocks of geese from France to Rome, 598.
- Plumage, change in the colour of from fear, 546; instances of, 546.
- Polish swan (*cygnus immutabilis*), range of the, 591; characteristics of the, 592.
- Porta, Baptista, his instructions for taming and training capons as nurses, 535.
- Poulardes, practice of making, not extensive in England, 543.
- Poultry, application of the word, 494; the origin of, satisfactorily ascertained, 494; no mention made of in records of the patriarchal age, 495; the importance of, greater than at first sight might appear, 515; sources of profit from, 518; returns in 1841 of the value of, in Ireland, 518; bad practice to under-feed, 542; best food for, 542; mode of fattening for the table, 542; practice of cramming, 543; in France by machinery, 543; mode of, 543; house, under the superintendence of a farmer's wife, description of a, 523; Maid, observations on poultry in a work entitled the, 520; shows, objects of, 519; yard, proper arrangement of a, 522.
- Pouter pigeon, the, a cross between the dragon, and old Dutch cropper, 579; description of the, 579; nothing pleasing in the appearance of the, 579.
- Prænestine pavement, pigeons represented on the, 575.
- Proceedings of the Zoological Society, notice of the gallus giganteus in the, 504; of the Herat fowl in the, 504; observations in the, on the gallus Sonneratii, and Stanleyii, 506.
- Punctum saliens, the, 529.
- QUADRUPEDS, the domesticated, various uses of, to man, 493.
- Querquedula, bill of the genus, 584.
- Guest, see Ring dove.
- Quill, the, as taken from the bird, 601.
- Quills, the preparation of, 600, 601; the sorting of, 601.
- RABBIT, the, and the guinea pig, rather prisoners than subjects to man, 493.
- Rasores, the order, 498; digestive organs of, 499; feet of, 498; food of, 499; the form of, 498; habits of, 500; head of, 499; legs of, 498; senses of, 499; voice of, 499; wings of, 498; choice of roosting places by, 501; dislike of, to wet and swampy situations, 500; manner of cleansing themselves, of, 501.

- Ray, Mr., his notice of the musk duck, 590.
- Réaumur, M., on the advantages of rearing capons as nurses, 535; on the difficulties of, 536; his apparatus for supplying to chickens the place of a living mother, 536; his preference of it, to a natural parent, 536; his experiment concerning the alteration in the position of the chick, 531; for hatching eggs from the heat of dung, 538; in a room over the bread oven of the institution called L'Enfant Jésus, 539; instance of a sudden dislike taken by two hens to a cock, noticed by, 526; his observations on the extrication of the chick from the shell, 532.
- Rhone duck, the, 588.
- Richardson, Dr., his account of the arrival of the Canada geese in the Fur Countries, 593; of the mode of feeding of the widgeon, 582.
- Richardson, Mr., his account of the annual export of eggs from Ireland to England, 518; passage concerning the rearing of turkeys, quoted by him, 557.
- Richmond park formerly tenanted by wild turkeys, 547.
- Ring-dove, habits of the, 573.
- Ring-necked pheasant, specimen of the, in the Chinese exhibition, 503.
- Rock-dove, description of the, 573; food of the, 574; wide diffusion of the, 572; doves, the great quantity of, found in various parts of the world, 572; pigeon, the wild, 495.
- Rodentia, animals of the order, subjected to man, 493.
- Romans, attention paid to the fowl by the, 502.
- Rome, parts of the peacock a favourite dish in, 561.
- Roup, 546.
- Ruff, the, 580.
- Ruminantia, the species of, subjected to man, 493.
- Rump gland, inflammation of the, 546; treatment of, 546.
- Russian fowl, characteristics of the, 515; sometimes gold or silver spangled, 515.
- Russell, Dr. his observations on the practice of employing carrier-pigeons, 578.
- SALT, partiality of pigeons for, 581.
- Sampan, Chinese, method of keeping ducks in, 589.
- Savannahs, of America, quantity of peafowl in, 565.
- Selby, Mr., his description of the stock-dove, 573.
- Serous layer, the, 529.
- Sex of the bird to come from each egg, theory that it is indicated by the shape of the shell, 527.
- Sexual marks, the distinctive, of turkey chicks, 558.
- Shake-bag, origin of the name, 511.
- Shecarries, their manner of taking the jungle-fowl, 507.
- Shed, a, should be erected to screen the fowls from the heat of the sun, 522.
- Shell, composition of the, 528; position of the, after the exit of the chick, 532; position of the chick in the, 531; the time taken by the chick in extricating itself from the, varies, 532.
- Shootings, used in decoys, 586.
- Shoveller duck, bill of the, 582.
- Silky fowl, characters of the, 514.
- Sketches of Persia, story told in the, concerning the turkey, 548.
- Snow-falls, travelling of turkeys in, 554.
- Solomon, domestic poultry kept in the time of, 496.
- Sonnerat's jungle-fowl, two species confounded under the name of, 506; habits and manners of, 507; description of the female of, 507; the male of, 506; colour of the male, 507; shape of the feathers of the male, resemble those of the curl-crested Araçari, 506.
- South America, the breeds of swans of, 591.
- Spangled, or Dutch everlasting layer, description of the, 512; Hamburg fowl, the, 511; the golden spangled variety, 511; the silver spangled variety, 512; Polish fowl, the, 511; distinction between, and the Hamburg, 511; Spanish fowl, description of the, 512; manner of preserving the pure strain of the, 512; merits of the, 512.
- Spathnæ, bill of the genus, 583.
- Spring chickens, to be sold to the feeder, 518.
- Stigma, the, 528.
- St. Jago fowl, the, derived from the Great Malay, 504.
- Stock-dove, habits of the, 573.
- Sulphur, flower of, useful in gapes, 545.
- Summer-duck, the, of America, 582.
- Sussex, the Dorking breed of fowl in, 513.
- Swan, the common (cygnus olor), characteristics of the, 591; breeds of the, in Europe and Asia, 591; a royal bird, 591; the flesh of the, 593; food of the, 592; habits of the, 592.
- Sykes, Colonel, specimens of the Great Malay fowl brought to England by, 504; his remarks concerning the gallus Sonneratii, 506.
- Systematic and pulmonic circulation, establishment of a, 530.
- TAIL, the true, of the peacock, 559.
- Tarshish, where situated, 496.
- Tongue of the anatidæ, 582.
- Trumpeter pigeon, description of the, 580; swan (cygnus buccinator), range of the, 591.
- Tumbler pigeon, description of the, 580.
- Tumblers, the flight of a flock of, 580.
- Tunnel-net, the, used in decoys, 586.
- Turbit pigeon, description of the, 580.
- Turkey, difficulty of accounting for the English name, 547; the dispersion of the, not so complete as that of the fowl, 548; doubts concerning the introduction of the, into England, 548; history of the, 546; mention of the, at various periods, 548; uncertainty respecting the date of its introduction into Europe, 546; the common (meleagris gallopavo), 549; season and manner of courtship of, 552; female excursions of the, with her young brood, 553; site selected by, for a nest, 553; often associate together, and form a common nest, 553; desert the males as soon as they begin to lay, 553; proper accommodation for, 555; selection of a male for breeding, 556; number of hens to a male, 556; management of, 556; management of a sitting hen, 556; cruelty of making the hen hatch twice in a season, 557; chicks, treatment of the, 557; proper food for, 558; poults, treatment of, after the first three months, 558.
- Turkeys, possibility of introducing a wild breed of, into England, 547; exaggerated accounts given of the weight of fattened, 559.
- Turpentine, usefulness of, in gapes, 603.
- Turtle-dove (the common), habits of the, 573.
- URACHUS, the, 531.
- Ure, Dr., his observations on Dutch quills, 601.
- VASCULAR tissue, the layer of, 529.
- Ventriculus succenturiatus, of the order Rasores, description of, 499.
- Vesicle of Purkinje, the, 528.
- Vesicula æris, 528.
- Virgil, his description of the habits of the rock-dove, 572.
- Vitellius, the Emperor, a favourite dish of, 561.
- WARMTH, manner of gaining for a hen-house, 520.
- Water, bad effects of young ducks visiting, too early, 588.
- Weld, Mr., his account of the egg-trade in Ireland, 517.
- Whistling swan, see Wild swan.
- White, Gilbert, his observations on the derivation of the house-dove, 574; on green vegetables as food for graminivorous birds, 573; on the peacock's tail, 560.
- White-fronted goose, the (anser erythropus), 596.
- White Poland fowl, the, extinct, 511.
- Wild duck more scarce in England than formerly, 585; former abundance of the, in England, 585; habits of the, 587; spots chosen for nests by the, 587; artifice practised by, to conceal her nest, 588; the scarcity of, in Egypt,

- Syria, and Persia, 590; wholesale destruction of the, 585; wide distribution of the, 585.
- Wild peacock, enemies of the, 561.
- Wild swan, see Hooper swan; the North American (*cygnus Americanus*), range of, 591.
- Wild turkey, the common, 550; habits of, 552; native country of, 551; weight of, 551; frequent crosses between, and the domestic turkey, 551; description of, by the Prince of Canino, 553; domesticated young reared from the eggs of, retain some of their usual propensities, 551; enemies of the, 554.
- Willughby, Mr., on the care of a capon for a brood of chickens, 535.
- Wilson, his account of the various decoys used for catching wild ducks, 586; anecdote of the Canada goose, related by, 595.
- Wiltshire, geese formerly on the commons of, 599.
- Windsor, description of the aviary for fowls at the Royal Home Farm at, 523.
- Windsor Forest formerly tenanted by wild turkeys, 547.
- Winter-laying, Mr. Mouat's experiments concerning, 520.
- Working birds, what, 587.
- YARRELL's curassow, 570.
- Yarrell, Mr., his observations on the sub-family *anatinae*, 583.
- Yolk, the, intended for the nourishment of the chick, for the first twenty-four hours, 530, 534.
- Young, Mr., on the construction of an artificial mother, 526.
- ZOOLOGICAL Society, prize offered by the, to the best breeder of curassows, 566.

INDEX TO BEES.

- APIS**, the honey-bee one of the species, 605.
Aspect, the proper, for a bee-hive, 619.
Artificial swarm, mode of making an, with the help of fumigation, 622, 623.
Architect, the bee, office of, 606.
- BARRICADES**, the, erected by bees, 616.
Bee bread, Réaumur's opinion concerning, 611; books, great number of, 605; dress, the proper manufacture of a, 625; enthusiasts of ancient times, 605; students of ancient times, 605; of modern times, 605.
Bee-hive, proper situation for, 619.
Bee-keeping, profits of, 618; proper commencement of operations for, 620.
Bees, ancient theory of the propagation of, 609; should be disturbed as little as possible, 619; the best mode of feeding, 620; uselessness and cruelty of the plan of annually destroying bees, 623.
Bevan, Dr., anecdote related by, proving that bees possess memory and language, 616; concerning the reasoning power of bees, 607; cases given by, concerning bee scouts, 612.
Borage, partiality of bees for, 618.
Broom, partiality of bees for, 618.
Buck-wheat, partiality of bees for, 618.
- CAREW, Mr.**, method of stocking his hives practised by, 609.
Cells, formation of the, 606; general construction of the, 607.
Children should be prevented from interfering with bees, 619.
Clover, partiality of bees for, 618.
Cocoon, formation of a, by the larva, 611.
Cold, bees' method of protecting themselves from, 621.
Combs, appearance presented by the, when completed, 607.
Corsair bee, attacks of the, on the humble bee, 616.
Criminals, the execution of, by bees, 617.
Curtain of bees, the construction of a, 610.
- DANGER** from bees, the best mode of avoiding, 623.
Death's head moth (*Sphinx atropos*) ravages of the, on bee-hives, 616.
Decoy hive, should be ready for a swarm, 622.
Double or treble hives, advantages of, 620.
Drones, cells of the, 610; massacre of the, 613.
- EGGS**, the deposition of, by the queen bee, 610.
Eke, an, the use of, 620.
- FLOWERS**, list of bee, 618.
French buck wheat, partiality of bees for, 618.
Fumigation, the best material for, 621; Mr. Cotton's mode of applying, 621.
- GLASS window** in the hive, use of a, 619.
Grant, Mr., his account of the proceedings of bees on finding a hive strewn with dead bees, 612; of the relays of labourers from the hive, 616; his experiments on the ventilation of a bee-hive, 619.
- Heath**, partiality of bees for, 618.
Hive, the best, 620; the, when the bees are asleep, 616; materials for the, 618; Mr. Grant's description of, 620.
Hives, the preference of bees for, 612; old, advantages involved in the practice of depriving, of their queens, 623.
Honey, the best mode of obtaining, 621; the prices of, in London, 618; the quantity of, obtained from a hive, 618; bearers, office of the, 608; bee, the natural history of the, full of interest, 605; comb, commencement of the, 606; moth, the, 617; deposition of the eggs of the, in the combs of a hive, 617.
Huber, M., his experiments, proving that bees have a language, 614.
Hymenoptera, the honey-bee of the order, 605.
- IMAGO**, the young, introduction of, into the external world, 611.
Instinct, bees should be left as far as possible to their own, 617.
Intruders, the treatment of, by bees, 609.
- *KEYS, Mr.**, his account of the behaviour of a hive of bees, on a mishap to a royal pupa, 615.
- LANGUAGE**, clearly bees have a, 614.
Larva, growth of the, 611; proceedings of the, within its cell, 611.
Lycoperdon, the use of, 621.
- MELILOTUS leucantha**, may be usefully grown for the especial gratification of bees, 618.
Mishaps, bees subject to, in the process of development from the egg, 615.
- NADIR-HIVING**, advantages of, 621.
Nurse-bees, office of the, 611, 612.
- OBSTACLES**, instances of the ingenious manner in which bees overcome, 607.
Officers, or magistrates, the bee, 617.
- PALEY, Dr.**, his observation on the sting of the bee, 614.
Pettigrew, Mr., his statement concerning the metamorphose of bees, 615.
Poets, the great attention of, to bees, 605.
Police, the bee, anecdote of, 617.
Pollen, the collection of, for the young bees, 608; bearers, office of the, 609.
Pretender, treatment of a, by bees, 615.
Proboscis, mechanism of the, 608; office of the, 608.
Propolis, what, 609; the various uses of, 609.
Pupa or nymph, change of the larva into a, 611.
- QUEEN bee**, the, 610; manner of conducting the contest between two young queen bees, 613; attachment of, to the working bees, 615; departure of the old from the hive, with a swarm of bees, 611; fecundity of, 610; the magical words uttered by, 613; young, behaviour of the eldest on learning that she has rivals in the hive, 613;

HABITS, natural, of the bee, 605.

- departure of, from the hive with the second colony, 613 ; stranger, the reception of a, some eighteen hours after the loss of the old one, 615 ; four-and-twenty hours after the loss of the old one, 615.
- REASON, innumerable instances of, in every department of bee economy, 607.
- Royal cells, the erection of the, 610 ; pupa, the true birth of the eldest, 612.
- SCAFFOLDING, the, formed by bees, 606.
- Sculpturers, the bee, office of, 606.
- Scouts, the bee, 612.
- Sentinels, the bee, 616.
- Shakspeare, his picture of the bee kingdom, 605.
- Side-box, advantage of attaching a, to a hive, 622 ; mode of preventing the queen bee from laying eggs in the, 622.
- Sting, action of the, 614 ; mechanism of the, 614.
- Stock of bees, method of doubling yearly, 618 ; mode of obtaining an increase of, without the inconvenience of natural swarming, 622.
- Straw hive, the, advantages of, 618.
- Super hiving, advantages of, 621.
- Swarm of bees, proceedings of a, on entering a new and unfurnished tenement, 605 ; the proper for a beginner to purchase, 620 ; mode of effecting the "junction of a weak to a strong, 623.
- Swarming, signs of the period of, 622 ; the inconvenient accessories of, 622.
- Swarms, departure of, from the hive, 612, 613.
- Sydserff, M., his estimate of the profits of bee keeping, 618.
- THORLEY, Mr., his description of a scene of great danger with bees, 624.
- Tongue of the bee, nature of the, 608 ; the, when at rest, 608 ; when at work, 608.
- VENTILATION, the, of the hive should not be interfered with, 619 ; the process of, by bees, 617.
- WALLS of the cells, straightening of the, 606.
- Warder, Dr., his test of bee loyalty, 614.
- Wax-workers, office of the, 606.
- Wild thyme, partiality of bees for, 618.
- Winter management of bees, 620.
- Worker-bee, metamorphose of the egg of, into a queen bee, 615.
- Workers in the hive, manner of feeding of the, 608.
- ZINC should never be used in bee-hives, 619.

